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Effect of Heat on Carbonaceous Materials

CARBONISATION in the broadest sense of the term, is a widely-used process in the chemical industry. Wherever an organic substance is heated with the occurrence of charring, there is carbonisation. The process is no doubt at its highest development in the treatment of coal for the production of gas or coke, of pitch for the production of pitch coke, and of wood for the production of charcoal; but there are also the active carbons, the electrode carbons, and graphite, besides a variety of other organic processes where heat treatment yields a carbonaceous deposit. It was no doubt for this reason that the Society of Chemical Industry has invited Professor H. L. Riley of Armstrong College, Newcastle, to deliver Jubilee Memorial lectures during the coming winter on "The chemistry of solid carbon."

Professor Riley has opened up a new line of research in this country by his investigations into the structure of coke by the crystallographic methods of X-ray analysis aided by chemical deduction and has read many papers upon this subject to technical societies during the past two or three years. It is interesting to see how these modern ideas upon the structure of carbonised organic products has arisen; if the substance we know as "coke" is here primarily referred to, for the good, and possibly sufficient, reason that its name is short and saves unnecessary words, it must be understood as referring to most or all solid products of carbonisation.

It is an interesting fact that when the reactivity of the various forms of carbon is tested, totally dissimilar results may be obtained according to the method used. The rate of wet oxidation of the various forms of carbon using, for example, syrupy phosphoric acid saturated with potassium dichromate at 100° C. is in the inverse order to the rate of dry oxidation using air or oxygen or carbon dioxide at high temperatures. This rule does not hold absolutely, because such extreme instances of carbon as the diamond have a low rate of oxidation by any method. It holds, however, reasonably well for a series such as low-temperature coke, gas coke, metallurgical coke, retort carbon, all of which it may be noted contain (unlike diamond) a little hydrogen and other elements.

This broad principle must, however, in the light of later work, be modified by the fact that the rate of wet oxidation diminishes from a low temperature coke made at 400° C. as the temperature of carbonisation is increased, finally reaching a minimum when the coke is made at 700° C., and thereafter rising rapidly and continuously with increasing temperature of carbonisation. The temperature of 700° C. is that at which the coke has just acquired an appreciable electrical conductivity. In the fundamental carbon crystal the carbon atoms are arranged in flat planes and situated at the corners of regular vicinal hexagons, the carbon atoms being connected to three others by non-polar valency bonds.

In Professor Riley's view the variation in the reactivity of carbon with the temperature at which it is prepared can be explained by a theory which involves the bonding of hydrogen atoms between the hexagon layer planes of the graphite crystal lattice. Several lines of indirect evidence which support this view were summarised in a recent paper by Professor Riley to the Faraday Society. It is noted that the volatile matter evolved above 700° C. is principally hydrogen; the rapid increase of electrical conductivity with increasing carbonisation temperature in the region of 700° C. suggests that the metallic electrons of the graphite lattice are concerned with the bonding of this hydrogen, which incidentally commences to be evolved in quantity just above 700° C. With increasing temperature of production the absorptive capacity of carbons increases up to 700° C. and then diminishes; the yield of mellitic acid, $C_6(COOH)_6$, increases rapidly with carbonisation temperature up to 700° C., and thereafter only slightly, indicating that aromatisation is nearly complete at this temperature.

The structure of carbons, therefore, is a mass of minute crystals or "crystallites" consisting of carbon planes of aromatic structure separated by hydrogen, or, in the carbons made at lower temperatures, by hydrocarbons. The much slower rate of wet oxidation of carbon prepared at lower temperatures is held to be due to the retardation or prevention of the penetration of the reagent between the carbon layers by this hydrogen or by residual hydrocarbon groups. It would appear possible that the increased reactivity of carbon made at lower temperatures to dry oxidation is due to the fact that the smaller oxygen molecules can enter between the planes and so attack both the bonding hydrogen or hydrocarbon molecules.

Much of the modern scientific doctrine appears at first sight to have an elusive and even metaphysical character, and this aspect of it seems to make the strongest appeal to many cultivated minds. Yet upon the whole, the main triumphs of science lie in the tangible facts which it has revealed; and it is these which will without doubt endure as a permanent memorial to our epoch.

—*Lord Rayleigh.*

Notes and Comments

Improvement in Export Trade

WHILE the Board of Trade returns for July still show an unfavourable position in general, they give evidence of a slight improvement in our export trade, the section in which improvement is of the greatest importance. Although exports were about £10 millions lower than they were in July, 1937, they are more than half a million pounds better than those of June, 1938. Imports show a fall of nearly £12 millions compared with July, 1937, but an increase of approximately £5 millions over the same month of 1936. With total exports for the first seven months of this year exceeding those for the same period of 1936 by £22½ millions, it can be seen that our foreign trade is much better than it was two years ago, although not reaching last year's peak. The import trade in chemicals last month followed much the same course as the aggregate imports of the country, with a gain in value on imports during July, 1936, but a decrease on July, 1937. Exports of chemicals, however, were down in comparison with the same month in both 1936 and 1937, but the total chemical exports for the first seven months of this year improved slightly over those for the corresponding period in 1936.

A Policy for the Encouragement of Agriculture

DEMANDS have been made recently from various quarters for increasing the home production of foodstuffs. It seems to be generally agreed that the best policy for safeguarding the community's supply of foodstuffs in the event of war would be storage of essential materials coupled with the maintenance of the output of home agricultural produce at a higher level than it has been in the past. Purchases of certain foodstuffs for storage have already been made, but although certain measures have been taken to assist home agriculture the results obtained so far have been anything but effective. The Ministry of Agriculture's annual census issued last Saturday records a further reduction in ploughland acreage and a slight increase in permanent grassland. This means that farmers are receiving insufficient inducement to work the land more fully. Subsidies, such as the lime and basic slag schemes, should be adopted to a wider extent to check the present tendency. While it is undesirable that Governmental backing should be used to procure a very marked and uneconomic increase in agricultural production, there should be some planned programme for the fostering of agriculture and to prevent any falling off in the acreage under plough.

Applications of Lauryl Compounds

THE first two numbers of the new Industrial and News Edition of the *Journal of the Indian Chemical Society* have now been published under the joint auspices of the Indian Chemical Society and the Institution of Chemists (India). These two numbers, bound together in one volume, contain nine original contributions and four editorial features—Technical Research Notes, Notes and News, Reviews, and Indian Patent Literature. Many of the articles have a specific interest to Indian industry such as, for instance, "Studies on Indian Coals," "Indian Coals for the Manufacture of White Portland Cement," and "Chemistry and Development of Industries in India." The remainder are of a more general nature, and one of these discusses the commercial possibilities of a new detergent and some related lauryl compounds. Alkali salts of sulphated fatty alcohols have been found to have good detergent properties, their outstanding quality being the solubility of the calcium and magnesium salts in water, so that they can be used equally well in hard or soft water. It has further been shown that compounds of the type $R.CH_2 OSO_3 Na$ (where R is an alkyl chain of 7 to 18 carbon atoms) are especially effective, but practical considerations limit the materials available to the lauryl, palmityl, oleyl and steryl compounds. Of these sodium lauryl sulphate is preferred owing to its superior wetting out and levelling properties and its many other qualities superior to soap. It is also a very efficient dispersing agent and possesses insecticidal properties. At present, lauryl alcohol is obtained from coconut and palm kernol oils which are expensive sources. The author of the paper, has, however, found a promising new source in seeds of the *Lauraceae* family.

Control of Inventions

YET another voice has been added to those that complain that the progress of scientific invention has been so rapid that the general community is unable to put proper use to the new powers in their hands. Last week, Professor C. E. M. Joud said that he would not let loose upon a modern community any more inventions until he had prepared the community for their impact. A board of scientists would be appointed to consider the granting of permits, to scientific inventions, no permit being granted to those inventions with results disastrous to the community. He said that it would also entail, as a first step, putting a veto on the publication of the results of scientific research, especially such as enabled us to increase our efficiency in the matter of slaughter, for at least twenty years. It is difficult to take Professor Joud's remarks seriously, the idea of a group of scientists with the responsibility of determining which discoveries are and which are not of benefit to the community is almost too fantastic to imagine, the task before them would be hopeless from the outset. The suggestion that no results of scientific research should be published would produce a gradual undermining of the technical skill at the back of the country's major industries. The second part of Lord Rayleigh's presidential address to the British Association for the Advancement of Science provides an effective reply to the general attitude framed in the foregoing suggestions.

An Ephedrine Shortage Averted

A GOOD example of the way in which modern chemistry can rise to the occasion when the supplies of natural raw material are cut off, by producing the material itself synthetically as distinct from providing a substitute, is given in the case of ephedrine. According to a correspondent of *The Times*, there were fears of a shortage of ephedrine owing to the hostilities in China and Spain preventing the export of the ephedra herb from which the drug is obtained. As these two countries represented the only satisfactory sources of the herb, the situation was serious, the problem was tackled in two ways. First, by using a low grade herb grown in India normally rejected by the manufacturers; and, second, by producing the drug synthetically. Synthetic production was undertaken on the Continent, but it is said that the cost of the product is well above the price of ephedrine obtained from the Chinese raw material. If the costs of the synthetic process can be cut down to a lower level than the natural product, then the opportunity provided by these exceptional circumstances will have been turned to good account.

The British Association Meeting at Cambridge

Presidential Address by Lord Rayleigh

OPENING his presidential address to the British Association, at Cambridge, on Wednesday, Lord Rayleigh, F.R.S., referred to the last occasion that the British Association met at Cambridge (1904), when Lord Balfour recalled the large share which Cambridge had had in the development of physics from the time of Newton down to that of J. J. Thomson and the scientific school centred in the Cavendish Laboratory. This reputation of the scientific school in the Cavendish Laboratory, continued Lord Rayleigh, was more than sustained in the interval under the leadership of Ernest Rutherford, whose death has left a blank which we can never hope to see entirely filled in our day.

Lord Balfour's address was devoted to topics which had long been of profound interest to him. He was one of the first to compare the world picture drawn by science and the world picture drawn by the crude application of the senses, and he emphasised the contrast between them. Some of those who learn the results of modern science from a standpoint of general or philosophical interest come away with the impression that what the senses tell us about the external world is shown to be altogether misleading. This is in complete contrast with the standpoint of the experimental philosopher. He knows very well that in his work he does and must trust in the last resort almost entirely to what can be seen, and that his knowledge of the external world is based upon it: even the metaphysician claims that we can learn much in any other way. It is true that the conclusions of modern science seem at first sight to be very far removed from what our senses tell us. But on the whole the tendency of progress is to bring the more remote conclusions within the province of direct observation, even when at first sight they appeared to be hopelessly beyond it.

The Rt. Hon. Lord Rayleigh, F.R.S., President of the British Association.

For example, at the time of Lord Balfour's address some who were regarded as leaders of scientific thought still urged that the conception of atoms was not to be taken literally. We now count the atoms by direct methods. We see the electrometer needle give a kick and we say, "There goes an atom." Again, the theory of radioactive decomposition put forward by Rutherford, however cogent it may have seemed and did seem to those who were well acquainted with the evidence, was originally based on indirect inferences about quantities of matter far too small to be weighed on the most delicate balance. This and many other points of view have seemed at first sight to contradict the direct indication of our senses. But it was not really so. They were obtained and could only be obtained by sense indications rightly interpreted. The senses were not primarily developed for purposes of research, and we have in large measure to adapt them to that purpose by the use of artificial auxiliaries.

Lord Rayleigh chose for the main subject of his address a survey of some of the ways in which such adaptations have been made. He described the mechanism of the human eye and how it can be modified, and traced the development of the microscope (ultra-violet and X-ray), spectroscopy and the photo-electric cell.

Much of modern scientific doctrine, continued Lord Rayleigh, appears at first sight to have an elusive and even metaphysical character, and this aspect of it seems to make the strongest appeal to many cultivated minds. Yet upon the whole, the main triumphs of science lie in the tangible facts which it has revealed; and it is these which will without doubt endure as a permanent memorial to our epoch. The main thesis has been that these are discovered by methods not essentially different from direct scrutiny, and it is hoped that the present survey may remind you that if we allow for a reasonable broadening of the original meaning of the words, it remains true after all that "seeing is believing."

In the second part of his presidential address, Lord Rayleigh considered the relationship of science and warfare. He said that during the Great War few scientific men in any country doubted that it was their duty to do what they could to apply their specialised knowledge to the purposes of war; nor was it often suggested by publicists that there was any countervailing consideration: on the contrary they urged strongly that our resources in this direction should be efficiently mobilised. It is chiefly in vague general discussions that the opposite view becomes vocal. Science, it is urged, is the source of all the trouble: and we may look to scientific men for some constructive contribution to finding a remedy. The whole idea that scientific men are specially responsible is a delusion born of imperfect knowledge of the real course of the process of discovery.

In the course of systematic study of the chemistry of carbon compounds it was inevitable that the action of nitric acid on substances like benzene, toluene, glycerine, cellulose and the like should be tried. No one could foresee the result. In the case of benzene, we have nitrobenzene, the key to the aniline dye industry. In the case of glycerine, Sobrero obtained in 1846 the highly explosive liquid called nitroglycerine. He meant no harm, and in fact his discovery lay dormant for many years, until Nobel turned his attention to the matter in 1863, and showed how by mixing nitro-glycerine with other substances, solid explosives could be made which admitted safe handling. Dynamite was one of them. They proved invaluable in the arts of peace, e.g. in mining and in making railway tunnels, such as those through the Alps. At all events, high explosives had been too long in use in peaceful industry for their misuse to be laid directly to the account of science.

Coming to poison gas, we recall that during the Great War chlorine was used on a large scale. Chlorine, however, was not isolated by chemists for this purpose: it was discovered 140 years before, as a step in the inquiry into the nature of common salt. Of the more recondite substances, we may take mustard gas—really a liquid—as typical. It is much more plausible to suggest that here was a scientific devilment, deliberately contrived to cripple and destroy. But what are the real facts?

Referring to Watt's "Dictionary of Chemistry" (edition of 1894), there is an article of less than forty words about mustard gas (under the heading of dichlordiethyl sulphide). After the method of preparation used by Victor Meyer has been mentioned, the substance is dismissed with the words "oil, very poisonous and violently inflames the skin. Difference from diethyl sulphide." There are sixteen other compounds described at comparable length on the same page. None of them are of any importance. A not uncommon type of critic would probably say that the investigation of them had been useless, the work of unpractical dreamers, who might have been better employed. One of these substances,

namely, mustard gas, is quite unexpectedly applied to war, and the production of it is held by the critics to be the work not of dreamers, but of fiends whose activities ought to be suppressed! Finally at the bottom of the page begins a long article on chloroform. This substance has relieved a great deal of pain, and on the same principle the investigator who produced it was no doubt an angel of mercy. The trouble is that all the investigators proceeded in exactly the same spirit, the spirit that is of scientific curiosity, and with no possibility of telling whether the issue of their work would prove them to be fiends, or dreamers, or angels.

Summing up what may be learnt from the experience of the past, Lord Rayleigh was of the opinion that the application of fundamental discoveries in science to purposes of war is altogether too remote for it to be possible to control such discoveries at the source. The world is ready to accept the gifts of science, and to use them for its own purposes. It is difficult to see any sign that it is ready to accept the advice of scientific men as to what those uses should be. Frankly, he was in doubt whether we can do much, but there is one thing that may be attempted. The Association has under consideration a division for study of the social relations of science which will attempt to bring the steady light of scientific truth to bear on vexed questions, and it was hoped that discussions will bear useful if modest fruit in promoting international amity.

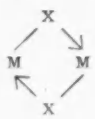
Recent Investigations in the Chemistry of Gold

Professor Charles S. Gibson's Presidential Address to the Chemistry Section

BY the results of investigations in which workers in this country have played an important part during the last ten years, it is now realised that fewer anomalies exist among the metals of sub-group 1B, copper, silver and gold, than was formerly believed to be the case, said Professor Charles S. Gibson, F.R.S., in his presidential address to Section B (Chemistry). The univalency and bivalency of copper and silver are well established; the tervalency of silver must still be regarded as doubtful. On the other hand, while the bivalency of silver has only been established comparatively recently, modern investigations have shown that it is extremely unlikely that gold can exist in the bivalent condition and this metal continues to exhibit the anomaly, distinguishing it from copper and silver, of existing only in the univalent and tervalent conditions.

Professor Charles S. Gibson F.R.S., President of the Chemistry Section of the British Association.

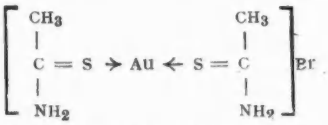
As far as the existence of normal salts is concerned, continued Professor Gibson, argentous silver differs greatly from cuprous copper and aurous gold. There is no evidence for the existence of any normal aurous salt and, for example, cuprous sulphate is at once decomposed by water with separation of metallic copper, and cuprous nitrate does not exist. On the other hand, in the solid state cuprous and silver halides have non-ionic lattices in their crystals which are isomorphous. Since cuprous chloride is bimolecular, it is reasonable to assume that in its halides the cuprous atom is 2-covalent. Recently, chemical evidence has indicated that this is also true of aurous gold in the analogous compounds and therefore under ordinary conditions the cuprous halides, the silver halides and the aurous halides would appear to have the general formula:



where X = halogen, indicating the 2-covalency of cuprous copper, argentous silver and aurous gold in these compounds.

That cuprous copper and argentous silver can exhibit 2- and 4-covalency is well established. It was proved by Bassett and Corbet (1924) in the course of their phase-rule study of complex cyanides, but the only complex cyanide of aurous gold of which they were able to prove the existence and to isolate was the well-known potassium aurocyanide, $K[Au(CN)_2]$. The inability of aurous gold to exhibit a higher co-ordination number than 2 has also been recently emphasised by Mann, Wells and Purdie (1936 and 1937) in their studies of the trialkylphosphine and trialkylarsine derivatives of cuprous, silver and aurous halides. The cuprous and silver components derived from the iodides have the general formula $[R_3P(As)\rightarrow Cu(Ag)I]_4$, as shown by their molecular weights. Crystallographic investigations strikingly revealed the existence of these four-fold macro molecules in the solid state and the tetrahedral configurations of the 4-covalent cuprous and argentous silver complexes and, in addition, and for the first time, the tetrahedral configuration of 3-covalent iodine. The trialkylphosphine and trialkylarsine derivatives of aurous chloride and aurous iodide have, however, the general molecular formula $R_3P(As)\rightarrow AuCl(I)$ and the molecule has probably a linear configuration. The trialkylphosphine-gold compounds are remarkably stable and can be distilled at low pressures without decomposition. On the other hand, Mann and his co-workers have suggested that in the non-electrolytes, $Et_3P(NH_3)_2AuCl$ and $(EtO)_3P(NH_3)_2AuCl$ prepared by Levi-Malvano (1908), the aurous gold atom is 4-covalent, acquiring seven electrons and having an effective atomic number of 86, the atomic weight of radon, the next inert gas. If this is the case these compounds are unique in the chemistry of gold; but it would appear that the determination of co-ordination numbers from ammonia derivatives is not always satisfactory.

If by using a more suitable co-ordinating compound than ammonia, it could be established definitely that aurous gold may be 4-covalent as well as 2-covalent, it would be interesting to determine whether such quadri-covalent aurous compounds like the quadricovalent cuprous and argentus compounds have a tetrahedral distribution of valencies. In this connection, the use of thioacetamide by Cox, Wardlaw and Webster (1936) for the successful preparation of *tetrakis*-thioacetamidocuprous and *tetrakis*thioacetamidoargentous chlorides does not appear to give an analogous aurous gold compound. The only aurous derivative of thioacetamide which Dr. F. H. Brain and Professor Gibson had been able to isolate is the somewhat unstable *bis*thioacetamidoaurous bromide (1937):



in which, as usual, the aurous gold atom is 2-covalent and has an effective atomic number of 82. In the light of available information we must conclude that in all its compounds the aurous gold atom is co-ordinated and, with the possible exception of the two compounds mentioned above, it is always 2-covalent. At the present time there is no example of an aurous compound in which the gold atom is known to be 4-covalent, and attempts to produce such a compound have failed. Since the tervalent gold atom is also always co-ordinated and in its stable compounds always 4-covalent—there may be a slight tendency for it to become 5-covalent—its chemistry can have little in common with that of other tervalent metals which form normal salts.

Much of the confusion of knowledge regarding the chemistry of gold as described in almost all text-books and more comprehensive works arises from the fact that the simple halide and cyanogen derivatives are regarded as normal metallic salts and given the formulæ AuCl, AuBr, AuI, AuCN, $AuCl_3$, $AuBr_3$ according to the fundamental uni- or tervalency of the metal. This is all the more surprising in view of the long-established and well-known fact that whenever gold is in solution or in the form of a soluble salt it is always present as a complex.

In a systematic discussion of the chemistry of gold, and allowing for the differences in fundamental valencies and covalencies of the metals, it would appear that gold is much more allied to palladium and to platinum—the pair of metals having the lowest melting points and the lowest densities of the six "precious" transitional metals—than it is to any of the other metals.

As far as the work on the chemistry of gold in which he and his colleagues have been concerned, Professor Gibson said, the chief advances have been achieved by studying in the first place the organic derivatives of the metal and, more recently, the gold derivatives of certain types of organic sulphur compounds.

Organic Derivatives of Gold

It is almost exactly thirty-one years ago since Sir William Pope and Professor Gibson (1907) prepared the first organic gold compound, then styled diethylauric bromide, just after Pope and Peachey (1909) had prepared the first organic platinum compound, trimethylplatinic iodide. But it was not until 1930 that the work could be resumed (Gibson and Simonsen 1930, Gibson and Colles 1931). In the earlier investigations the poor yield of the product of the interaction of the Grignard reagents and the ether soluble hydrochloro- or hydrobromoauric acids, $HAuX_4.3H_2O$, rendered the detailed study of these new organic gold compounds somewhat difficult. As starting material, the easily prepared pyridinotrichlorogold—less frequently, the corresponding bromine derivative—is now used and the following reaction is carried out in an ether-pyridine mixture using the relative quantities indicated:

$$2C_5H_5N.AuCl_3 + 4MgRBr \rightarrow 2C_5H_5N.AuR_2Br + 3MgCl_2 + MgBr_2$$

The pyridine co-ordination compound is decomposed later by the action of hydrobromic acid and the compound isolated through its water soluble co-ordination compound with ethylenediamine which, again, may be decomposed by a suitable acid. It takes some three to four hours to obtain the pure material and the average yield is rather more than 25 per cent. of the theoretical quantity and yields as high as 38 per cent. have been obtained.

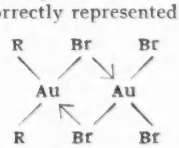
The isolation of homologues of the first prepared compound was easily accomplished. The experimental proof that these are non-electrolytes, that they have molecular weights corresponding to those of twice their empirical formulæ and that they and their co-ordination compounds all contain 4-covalent auric gold led to the realisation that the 4-covalency is an essential feature of all auric compounds.

Taking the ethyl compounds as typical, the following are examples of some of the non-electrolytes which have been prepared: Diethylmonobromogold, amminodiethylbromogold, pyridinodiethylbromogold, dibenzylsulphidodiethylbromogold, and acetylacetonediethylgold. All these and analogous compounds are soluble in hydrocarbon and other organic solvents and some interest attaches to the fourth and fifth compounds. Dibenzylsulphidodiethylbromogold (Brain and Gibson 1938) is the first auric compound of this type to be prepared by the direct addition of an organic sulphide to an auric compound. The compound separates rapidly and no reduction of the auric compound or oxidation of the sulphide takes place. Acetylacetonediethylgold is the first of these organic gold compounds containing no halogen to be prepared.

A Study of Some Non-Electrolytes

One would expect that non-electrolytes analogous to the above amino and pyridino derivatives containing ethylenediamine should exist. The first compound of the type was prepared from di-*n*-propylmonobromogold (R = Pr^n) and no analogous compound was obtained from diethylmonobromogold; but analogous cyanogen compounds are easily obtained both in the ethyl and propy series. Monoethylenediaminotetra-*n*-propyldibromodigold (Burawoy and Gibson, 1934) is a fairly stable colourless crystalline, 4-covalent auric compound soluble in certain organic solvents. On standing at the ordinary temperature, its solutions in chloroform or benzene slowly becoming cloudy due to the formation of the salt: ethylenediaminodi-*n*-propylgold bromide, is insoluble in such solvents as chloroform and benzene. The decomposition of the monoethylenetetraalkyldicyanodigold compounds follows a different course and indicated that suitable organic gold compounds may be the potential source of free radicals (see below) and that it is possible to prepare mixed auric-aurous compounds containing 4-covalent auric gold and 2-covalent aurous gold in the same molecule. While the analogous ethyl compound has not been prepared, Dr. F. H. Brain and Professor Gibson (1938) have recently prepared the following compounds: Mono-$\beta\beta'$-diaminodiethylethertetraethyldibromodigold, m.p. 87°, mono-asym.-N-diethylethylenediaminotetraethyldibromodigold, 84°. Other cases of the initial production of free radicals will be mentioned and their production from compounds containing two 4-covalent auric gold atoms in the molecule always results in the simultaneous production of a mixed auric-aurous compound in which the gold atoms are 4-covalent and 2-covalent respectively.

The monoethyl and mono-*n*-propyldibromo compounds have been studied in some detail (Pope and Gibson 1907, Burawoy and Gibson 1934 and 1935). They are easily prepared by the action of the calculated quantity of bromine on the dialkylmonobromogold compounds in chloroform or carbon tetrachloride solution. They are highly crystalline and deep red in colour; they are soluble in solvents which are not readily brominated or oxidised and therefore unstable in such solvents as ether, alcohol, acetone, benzene, ligroin, etc. Their molecular weights (determined in freezing bromoform) show that their general formula is $(RAuBr_2)_2$ and the high dipole moment in carbon tetrachloride solution of the *n*-propyl compound (μ = 6 D) affords proof that the constitution of these auric compounds is correctly represented thus:



This is in keeping with their formation from equimolecular quantities of dialkylmonobromogold compounds and tribromogold and with their physical and chemical properties. Slowly, on standing, more rapidly, in a current of an inert gas at the ordinary temperature, and still more rapidly, when heated at a temperature just above the boiling point of the alkyl

bromide, they decompose quantitatively into alkyl bromide and gold monobromide. Chemically, the monoalkyldibromogold compounds behave as equimolecular mixtures of gold tribromide and the dialkylmonobromogold.

By the direct action of silver cyanide on the dialkylmonobromogold compounds, the corresponding cyano derivatives are easily prepared (Gibson, Burawoy and Holt 1935, Burawoy, Gibson, Hampson and Powell 1937). These compounds have unique properties and the detailed investigation of the ethyl and *n*-propyl compounds have revealed a number of interesting features in connection with the general chemistry of gold. The dialkylmonocyanogold compounds are colourless highly crystalline non-electrolytes, soluble in hydrocarbon solvents, and their molecuar weights in freezing bromoform are four times those required by their empirical formulæ These compounds, therefore, unlike any other gold compounds so far described, contain four atoms of tervalent gold in the molecule. In the molecule of such compounds, the gold atoms must be attached to the carbon atoms of the cyanogen groups and the nitrogen atoms must be co-ordinated to neighbouring gold atoms.

The dialkyldicyanodigold compounds are non-electrolytes like the dialkylmonocyano-gold compounds, but unlike the latter they are very sparingly soluble in organic solvents and they decompose without melting. They constitute further examples of mixed 4-covalent auric and 2-covalent aurous compounds.

During the past two years, our knowledge of the structure of various types of gold compounds has developed considerably as a result of X-ray crystallographic investigations. Those on the organic compounds are being carried out at Oxford by Powell (1937) and his collaborators, those on Mann's co-ordination compounds of aurus gold at Cambridge by Wells (1936) while Cox and Webster (1936) have carried out their investigations on potassium bromoaurate at Birmingham. These investigations have established the planar configuration of the four valencies of tervalent gold and the linear configuration of the two valencies of auros gold.

On Thursday, Professor C. S. Gibson, assisted by Dr. F. G. Mann, Mr. H. V. Thompson and Dr. F. H. Brain, gave a demonstration in Section B lecture room on the production of gold films by chemical methods.

During 1856, Faraday was occupied in determining the experimental conditions for the production of thin metallic, chiefly gold, films with a view to the investigation of their optical properties. This work had important consequences in other directions, and Faraday refers to " this long and as yet nearly fruitless set of experiments on gold " probably because he was not successful in producing gold films to his own satisfaction. It is interesting, however, that Faraday appears to foreshadow the modern method of producing films of gold and other metals by the " sputtering " process.

The demonstration was concerned with some methods of the production of gold films and their application in the arts. The application of gold films to surfaces of glass and porcelain has long been known and the production of gold mirrors—having magical properties and being the criteria of excellence—whether of glass to which beaten gold was applied mechanically or of polished alloy was known to the early Chinese, Egyptians, Greeks and Romans. A recipe for the production of a golden mirror is given by Geber. The application of gold films to ceramics was described and demonstrated as far as possible by Mr. H. V. Thompson with the collaboration of Mr. Bernard Moore and Colclough China, Ltd., of Stoke-on-Trent. Dr. F. G. Mann showed the production of gold films on glass by the action of heat on the trialkylphosphineaurous halides which he has recently described. Professor C. S. Gibson, F.R.S., and Dr. F. H. Brain demonstrated the production of gold films by the decomposition of organic gold compounds at the ordinary temperature and indicated their application in the arts especially as mirrors and for decorative purposes by a number of specimens.

Papers Presented before the Chemistry Section

Symposium on Modern Methods of Chemical Analysis

A SYMPOSIUM on modern methods of chemical analysis, with exhibits, was held on Friday. In an introduction, Dr. J. J. Fox pointed out that the requirements of analytical chemistry are now so extensive, that the older methods have had to be revised and extended in many directions. Particularly the development of methods of micro- and semi-micro-methods has attracted workers all over the world. It is not too much to state that these methods, and their accuracy, have rendered possible investigations which could not have been carried out without them. An important advance in analytical methods arises from the extending utilisation of physical processes. These have resulted in advance in two directions, namely, accuracy and speed of analysis. For example, the use of spectrographic methods renders it possible to examine alloys of various kinds with speed and sufficient accuracy for many industrial processes. Further, the spectrographic method is available especially for the determination of minute quantities of various elements in biochemical, agricultural, and general chemical analysis. More recently infra-red spectroscopy has been utilised in such determinations as the proportions of *o*- and *p*-hydroxydiphenyl sometimes found present in traces in synthetic phenol.

For the purposes of demonstration two methods were chosen. The first was the determination of moisture by means of the variation in the dielectric constant. This method is particularly suitable when large numbers of similar products, *e.g.*, cereal powders, have to be examined for moisture. The apparatus must be calibrated for each kind of material and with suitably devised cells determinations can be made readily in a few minutes, thus enabling products to be sorted out rapidly. Extension of the method to liquids is obvious and apparatus is on the market for the purpose. It should be noted that the usual form of apparatus fails when the moisture is high and electrolytes are present.

A second method demonstrated was the polarographic method associated with the name of Heyrovsky. An apparatus has been devised whereby the curves are plotted by means of a recording pen, thus dispensing with the necessity for visual or photographic recording. It must be stressed that in work of this kind calibration of the apparatus is essential for the problem in hand. This applies equally to many other physical methods, *e.g.*, colorimetric and nephelometric determinations.

Professor Walther Gerlach made contributions concerning spectrochemical analysis with special reference to biological preparations.

Professor Fritz Feigl dealt with inorganic and organic spot-analysis. He said that the so-called spot-analysis is a microchemical technique of qualitative analysis; it consists in the application of highly sensitive reactions to the detection of inorganic and organic compounds in one drop of solution or with traces of the solid substance. Such spot tests are carried out by mixing one drop of the solution and one drop of the reagent on filter paper or in small crucibles or on the so-called spot plates. Filter papers which are impregnated with the particular reagent are very useful. The special apparatus required is very simple. By means of spot analysis it is possible to carry out specific detections on minute amounts of material and to recognise quantities down to fractions of a millionth of a gram. The saving in material, time and work is the predominating characteristic of spot analysis. The right choice of suitable reactions is of importance. Only such

reactions as are sensitive and specific are used. Therefore the theory of spot analysis is bound up with the chemistry of so-called specific reactions and with all measures whereby sensitivity can be increased. Of great importance are the application of organic reagents, the employment of catalysis and the use of colloidal and capillary phenomena. The formation of fluorescent compounds is also used.

Dr. JANET MATTHEWS, in a contribution relating to micro-analysis, said that the inorganic micro-methods of quantitative analysis are now sufficiently developed to warrant their adoption in both research and technical problems. The filter stick technique has been successfully used already in problems of plant nutrition in growth experiments with barley. Without the use of micro-methods the research would have entailed the growth and drying of so much plant material as to render it quite unfeasible; nitrate, potash, phosphate, calcium, magnesium and approximate silica were determined in about 200 samples, which on the macro scale would have involved enormously increased labour.

Another application of micro-methods actively in progress is in the analysis of dust, especially in connection with work on silicosis and allied diseases caused by the inhalation of dangerous dusts. Micro-methods enable a quantitative gravimetric analysis to be carried out on a total of about 50 mgm. of material, the analysis including silica, iron, alumina, calcium, magnesium, sodium, potassium and loss on ignition. The methods are also capable of application in the cement and glass industries, the paper industry and many other industries, and preliminary work on some of these applications is at present in progress. This shows that a trained analyst can learn micro-methods extremely rapidly and in the first week of work attain, for example, figures for silica in glass with errors of less than ± 0.1 per cent. difference from the calculated value.

A brief description was given of methods for the determination of silica, iron, sulphate, phosphate and nitrate which are found to give good results carried out on a micro-scale.

Dr. H. JACKSON gave a short survey of various types of apparatus which have been devised during the past few years for the accurate micro-estimation of the degree of unsaturation of organic compounds, together with a more detailed account and demonstration of the technique used in a particular form of apparatus. This was followed by a description and demonstration of the application of the technique to the construction of an all glass, quantitative system functioning at atmospheric pressure, which is designed to cover all ordinary laboratory requirements.

Dr. K. K. NYGARD and Dr. TH. GUTHE spoke about the application of the photo-electric principle to the determination of ascorbic acid. By the use of an original, previously described apparatus termed the photelgraph, they have succeeded in automatically recording, by the photo-electric principle, various processes in which a relative change in trans-illumination of the specimen occurs during the process.

This principle has been applied to a study of the well-known specific reduction of a solution of methylene-blue under the influence of artificial light in the presence of ascorbic acid. Under standardised conditions this process is quantitative as concerns each of the three main factors participating in this photo-chemical process. The present method records automatically and graphically on photo-sensitive paper the degree of reduction taking place.

With constant, known values of the artificial light, exposing methylene-blue solution of known, constant concentration, the geometric appearance of the tracing obtained indicates indirectly the quantity of the third and variable factor, the ascorbic acid. This quantity expressed in micrograms per cm^3 of solution is obtained by comparison of the tracing with that of a solution containing a known concentration of ascorbic acid. By this method it has been possible to determine quantities less than 0.05 microgram of ascorbic acid per 100 cm^3 of solution.

Society of Chemical Industry

Autumn Meeting in Glasgow

THE Society of Chemical Industry will hold their autumn meeting in Glasgow, September 16 to 20. This meeting is supplementary to the annual meeting of the Society, which was conducted in Canada.

On Friday morning, September 16, there will be an unofficial visit to the Empire Exhibition. In the afternoon, at the Royal Technical College, George Street, will be held a joint meeting with the Institution of Chemical Engineers, the subject of the paper being "Chemical Engineering in the Fermentation and Distilling Industries," by R. Gilmour, B.Sc., Ph.D., M.I.Chem.E. Dr. William Cullen will take the chair. The dinner of the Institution of Chemical Engineers will be held at the Ca'doro Restaurant, Union Street, Glasgow, at 7 p.m., members and guests of S.C.I. being invited to participate. President's reception at Ca'doro Restaurant at 8.30 p.m., at which Mr. W. A. S. Calder will deputise for the President, who is abroad.

Saturday, September 17, will include an organised visit to the Empire Exhibition, when parties will be guided to selected exhibits of interest and special demonstrators will be available. A symposium on "The Trend of Progress. Where are we heading?" will be held in Congress Hall "A," Concert Hall, Empire Exhibition. For the Food Group an opening paper will be presented by L. H. Lampitt, D.Sc., F.I.C.; for the Road and Building Materials Group, by R. Fitzmaurice, B.Sc., A.M.Inst.C.E. (Building), and J. O. Willis, B.Sc., A.G.I. (Roads). A reception will be held in the Palace of Arts by invitation of the Earl of Elgin, President of the Empire Exhibition Committee, at 8 p.m.

Sunday, September 18, will be devoted to an all-day excursion to Loch Lomond, and afternoon tea will be served. The party will have one hour ashore at Inversnaid. Return to Balloch, 6.30 p.m.; arrive Glasgow Central, 7.30 p.m. Inclusive tickets, 12s. 6d. each. The train times may be subject to slight modification, of which full notice would be given.

On Monday, September 19, the symposium will be continued at the Empire Exhibition, opening papers for the Plastics Group being presented by V. E. Yarsley, D.Sc., F.I.C., and for the Chemical Engineering Group, by Professor W. M. Cumming, D.Sc., F.I.C., and F. Rumford, B.Sc., A.M.I.Chem.E.

Wax in Petroleum

Method of Separation Developed by Bureau of Mines

A BASIC method for analytical separation of wax from oil in crude petroleum and petroleum distillates has been developed by the Bureau of Mines, U.S. Department of the Interior. The need for an accurate analytical method for the separation of wax from oil by means of organic solvents, arose in connection with recent studies of crude petroleum and its wax distillates. Two selective solvents (acetone and methylene chloride) are employed with control of the temperature at which the separation is made, solvent-solute ratio, and relative proportion of the two components of the solvents. A report recently published (Bureau of Mines Technical Paper 583) giving the results of the study presents data to illustrate the application of the method and describes the simple laboratory apparatus.

Because the solubilities and intersolubilities of the wax, oil, and solvent in an intimate mixture vary at different temperatures and concentrations, no definite proportions of solvent to oil were found generally applicable to all oils used to obtain the desired extractions. Some preliminary experimentation always was necessary to determine the quantity of solvent and the extraction needed to separate all the wax or a particular group of waxes.

Chemical Trade with the Netherlands East Indies

Reduced Imports of Sulphate of Ammonia

THE total import volume (62,800 tons) of imports into the Netherlands East Indies from the United Kingdom in 1936 was less than that in 1935, but rose in value from 21.8 to 22.1 million florins, states the "Report on Economic and Commercial Conditions in the Netherlands East Indies" (Stationery Office, 2s. 6d.). The decline is accounted for by lessened imports of cut tobacco and of sulphate of ammonia (under international arrangements) and by continental competition in iron tubing, galvanised roofing and other metallurgical products.

Increased imports from United Kingdom during the first nine months of 1937 included ammonium chloride, 152 tons (as compared with 44 tons for 1936), and dry zinc white, 490 tons (as compared with 260 tons). Decreases included caustic soda, nil (as compared with 2,900 tons), on account of revised cartel arrangements mainly to the advantage of the U.S.A. and Holland. German competition in 1937 (first nine months), as compared with 1936 period, was strong in aniline dyes and indigo, 1,300 tons (as compared with 700 tons); sulphate of ammonia, 6,800 tons (as compared with 24,200 tons).

Initial quotas of chemical fertilisers fixed for the period March-December, 1935, were increased as under:—(a) Superphosphates and bisuperphosphates: 1935, 5,334 gross metric tons; 1936, 4,200; (b) Manures, n.o.s., 1935, 13,334 gross metric tons; 1936, 18,000.

Quantities reserved in each case for Holland were (a) 40 per cent., and (b) 46 per cent. Japanese imports declined accordingly. Licences are only granted to firms who have been engaged in the importation of fertilisers for some years. Contracts were passed by the Government in November, 1937, for the distribution (virtually gratis) to the peasantry, in 1938, of locally-produced Cheribon natural phosphates to intensify rice culture. The expensive double phosphates of Dutch origin are beyond the reach of the Javanese peasants.

Sulphate of Ammonia for Sugar Plantings

Sulphate of ammonia is imported for sugar, tobacco, tea, and rubber estates. There is no local manufacture. Owing to restricted sugar cultivation in 1936, requirements were less than in 1935. However, the cultivation of most other crops was extended and the expansion of the sugar plantings in 1937 necessitated large supplies.

In 1936, the total imports of cement were 82,859 tons valued at fl.1,061,316 of which Japan, Germany, Denmark and Belgium (in that order) were the chief suppliers. Local production in 1936 totalled 144,537 tons. The permissible import quota has been raised from 45,900 tons (1935) to 59,500 tons (October, 1937-October, 1938). Small lots of rapid hardening cement of United Kingdom origin find a market.

The restriction of imports of soap to 1,900 tons (1936) and 1,600 tons (1937) has seriously affected United Kingdom imports. A mass-production factory set up in Batavia in 1934-1935 is responsible for the practical elimination of a wide range of soaps formerly imported. Imports of hard washing soaps dwindled from 3,284 tons in 1934 to 450 in 1937 (nine months). A second large-scale soap factory under Chinese management began production in Batavia at the end of 1937.

All kinds of paints, lacquers, varnishes, stains and distempers are made locally in medium and superior qualities. Total production in 1936 was 3,200 tons. United Kingdom trade has suffered heavily in this branch, shipments having dwindled to 847 tons in 1936, when total imports were 2,254 tons. Japanese competition, especially in lower qualities, is acute.

For the year 1936, production and exports of tin in metric tons were respectively 2,922.3 and 1,952 below permissible quotas.

Crude oil poduction rose from 6,081,623 tons (1935) and 6,437,798 tons (1936), to a record figure of 7,262,055 tons in 1937, putting the Netherlands East Indies in the fifth place of world producers. Of the quantity produced in 1937, 725,403 tons were sold as fuel and 6,502,098 tons were delivered to refineries. Refinery production in 1937 included: benzine, 1,837,283 metric tons; residue, solar and diesel oil, 2,706,570 metric tons; kerosene, 1,090,102 metric tons; aviation spirit, 308,633 metric tons; paraffin wax and ceresina, 75,041 metric tons; lubricating oils, 32,302 metric tons; and white spirit, 83,266 metric tons.

The new manufacturing plant for turpentine and resin which is being installed at a cost of fl.75,000 will bring annual output of the State factory in Atjeh (North Sumatra) up to 4,850 tons of turpentine, with 3,150 tons of resin. As regards turpentine, demand was weak and U.S.A. competition strong, so that 500 tons remained unsold in 1935. Results in 1936 improved. Production in 1937 exceeded estimates by 1,650 metric tons for gum resin and 530 for turpentine.

Import trade of the whole of the Netherland East Indies for the first nine months of 1937, in respect of chemical products, was valued at £32,453, as compared with £19,374 for the first nine months of 1936.

LIQUEFIED HYDROGEN CHLORIDE

LIQUEFIED hydrogen chloride, manufactured by drying the gas produced by the combination of chlorine and hydrogen in sulphuric acid, compressing it to 60 atm. and liquefying, is now employed as a convenient means for the production of the gaseous acid at plants which themselves do not manufacture the material, and also in the liquid phase for such reactions as the conversion of ethylene into ethyl chloride or acetylene into vinyl chloride. Most organic compounds are readily soluble in liquefied hydrogen chloride. Liquefied hydrogen chloride, according to Dr. E. Schwabe, in a paper read before a number of German chemical organisations at Bayreuth, will probably have a very important future in the wood saccharification industry. Supplies are obtainable from J. M. Steel and Co., Ltd.

A REMINDER!

Saturday, September 3, is the date of the finals of the eighth annual CHEMICAL AGE *Lawn Tennis Tournament. They will take place at Alderbrook Park, Cranleigh, Surrey, by kind invitation of Mr. A. Van den Bergh, chairman of Van den Bergh's and Jurgen's, Ltd., and joint vice-chairman of Lever Brothers, and Unilever, Ltd. Full particulars, including travelling arrangements, were published in the August 6 issue. Members of the chemical industry wishing to attend should apply for tickets as soon as possible to the Editor,* THE CHEMICAL AGE, *Bouverie House, 154 Fleet Street, E.C.4.*

R. J. Sleap (United Yeast Co., Ltd.) and F. Darton (J. Buchanan and Co. Ltd.) have now entered the finals of the men's doubles by beating C. C. Gough and T. P. Williams (Lever Bros., Port Sunlight, Ltd.), 12-10, 6-3, 6-1, in the semi-final round. They will meet G. W. Hole (Anglo-Saxon Petroleum Co., Ltd.) and C. G. Smith (Shell-Mex and B.P. Ltd.), the holders, in the final. The latter defeated A. F. Eyres and W. Hoppe (Johnson Matthey and Co., Ltd.) by 6-3, 6-0, 6-1, in the semi-finals. Who are to appear in the finals of the men's singles is not yet known, as the two semi-final matches have still to be played off.

Sir Gilbert Morgan's Retirement from the Directorship of the Chemical Research Laboratory

To take up New Appointment in October

IT was recently announced that Sir Gilbert T. Morgan, F.R.S., Director of the Chemical Research Laboratory, Teddington, since 1927, would shortly retire. It is now learnt that he will retire from the Directorship at the end of September and will then become Chairman of the Research Fund Committee of the Institute of Brewing. When the original announcement of his retirement was made everyone who knows him realised that it could not mean a complete withdrawal from the chemical world which owes him so much for his original researches and contributions to the literature. His new appointment, therefore, comes as no surprise. It is a further testimony to that vigour and efficiency which have placed him as one of the leading chemists of our time.

Sir Gilbert T. Morgan F.R.S.

Sir Gilbert Morgan received his first training in science at the Central Foundation School of London, at the time when Dr. Richard Wormell was headmaster, and he was, incidentally, contemporary with Sir Ernest Benn. While at school he won the Holl Scholarship to Finsbury Technical College, where he remained for three years. For the first two years at Finsbury he attended the usual college courses in chemistry, physics and engineering, and in the third year did chemical research in Professor Meldola's private laboratory; research under Meldola was indeed an auspicious start. He temporarily forsook academic life, however, being appointed research and works chemist to Read Holliday and Sons, Ltd., the Huddersfield colour manufacturers. After five years' industrial experience he again returned to more scholastic pursuits as a national scholar at the Royal College of Science, Kensington. Here he gained the diploma of associateship of the college and the bachelor of science degree of London University, both with first class honours in chemistry. He was then appointed to the college staff under Sir William Tilden, and, after promotion through the stages of demonstrator and lecturer, became Assistant Professor in 1908.

In 1912 he was promoted to full professorial rank on his appointment as Professor of Chemistry at the Royal College of Science for Ireland, Dublin, in succession to Sir Walter Hartley. He returned to England in 1916 to succeed Dr. Raphael Meldola as Professor of Applied Chemistry at Finsbury Technical College. He left Finsbury in 1919 on being appointed to the Mason Chair of Chemistry in the University of Birmingham, and remained there until 1926, when he accepted the post of Superintendent in the Department of Scientific and Industrial Research. Here he took a leading part in the early development and organisation of the new chemical laboratory at Teddington, being promoted Director of Chemical Research in 1927. Under his Directorship the Laboratory made great progress; the scope of the work undertaken widened considerably, as can be seen from the contributions by members of the Laboratory published in scientific journals, and the organisation grew in national importance. At the present time the staff of the Laboratory numbers about eighty, of whom some twenty-five are university graduates in science.

During a long career as a research worker, Sir Gilbert Morgan has been a most prolific contributor to chemical literature. He has published no less than 350 original papers, either independently or with collaborators, on a wide variety of subjects in pure and applied chemistry, together with three chemical treatises:—"Organic Compounds of Arsenic and Antimony" (in 1916); "Inorganic Chemistry: A Survey of Modern Developments" (with F. H. Burstall, in 1936); and "British Chemical Industry: its Rise and Development" (with D. D. Pratt, in 1938). He was also editor of the chemical section of the 14th edition of "Encyclopaedia Britannica" and editor of the Journal, and other publications, of the Chemical Society from 1902 to 1906.

His work has brought him many honours. In addition to the degrees of D.Sc. (London) and M.Sc. (Birmingham), he was awarded the honorary degrees of LL.D. (Birmingham) and Sc.D. (Dublin). He was elected a Fellow of the Royal Society in 1915 and an honorary member of the Society of Public Analysts and other Analytical Chemists in 1934. At one time or another he has occupied the presidential chair of many of the important scientific organisations. Thus, he was President of the British Association of Chemists from 1926 to 1928, President of Section B (Chemistry) of the British Association for the Advancement of Science in 1930, President of the Society of Chemical Industry from 1931 to 1932, President of the Chemical Society from 1933 to 1935, and President of the Institute of the Plastics Industry from 1935 to 1937. His services to the country were recognised by his knighthood in 1936.

Lanalol Ltd.

An Injunction to Restrain Use of Proprietary Name

IN the Chancery Division, on Wednesday, Mr. Justice Morton had again before him the motion by Lanalol, Ltd., for an injunction restraining the defendant, Tutton, from offering for sale under the name of Laniloll a preparation in alleged infringement of the plaintiffs' trade mark.

Mr. Shelley, for the plaintiffs, said the defendants were now willing to give an undertaking till the trial of the action.

Mr. Mould, for the defendants, said he was prepared to give an undertaking till the trial of the action. His clients' preparation would not be on the market for some time. It was an intricate preparation, and under the circumstances he submitted the motion was unnecessary, and that the costs should be reserved.

Upon an undertaking the motion stood over till the trial of the action, the costs of the motion being reserved pending the trial of the action.

SEVERAL deposits of copal resin have been discovered in Russia during the past year, the most important being those in the Caucasus and Far East, from which excellent varnishes have already been produced.

British Overseas Chemical Trade in July

According to the Board of Trade returns for the month ended July 31, 1938, imports of chemicals, drugs, dyes and colours were valued at £1,026,304, as compared with £1,098,638 for July, 1937, a decrease of £72,334. Exports were valued at £1,669,804 as compared with £2,151,910, a decrease of £482,106. Re-exports were valued at £40,103.

Imports

	Quantities. July 31.		Values. July 31.	
	1937.	1938.	1937.	1938.
			£	£
Acids—				
Acetic .. .. cwt.	9,997	7,303	11,102	9,400
Boric (boracic) .. ,,	2,800	1,280	2,938	1,505
Citric .. .. ,,	1,653	2,010	6,588	8,031
Tartaric .. ,,	2,897	1,920	12,859	8,855
All other sorts .. value	—	—	8,462	5,502
Borax .. .. cwt.	26,700	7,105	15,478	4,515
Calcium carbide .. ,,	95,364	85,792	52,305	40,159
Fertilisers, manufactured—				
Superphosphate of lime tons	829	—	1,708	—
All other descriptions ,,	1,917	2,186	11,117	12,568
Potassium compounds—				
Caustic and lyes cwt.	9,287	6,494	9,531	8,505
Chloride (muriate) ,,	40,640	87,002	14,966	31,015
Kainite and other potassium fertiliser salts cwt.	1,400	62,867	222	12,215
Nitrate (saltpetre) ,,	7,984	3,723	5,858	2,966
Sulphate .. ,,	74,620	70,800	34,435	32,926
All other compounds ,,	6,912	9,339	9,931	11,337
Sodium compounds—				
Carbonate, including soda crystals, soda ash and bicarbonate cwt.	133	444	106	378
Chromate and bichromate .. .. cwt.	1,211	1,498	1,517	1,859
Cyanide .. ,,	4,526	9,186	10,194	22,400
Nitrate .. .. ,,	30,265	94,114	6,605	28,537
All other compounds ,,	21,935	16,774	24,186	16,110
Chemical manufactures value	—	—	316,398	339,679
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts .. .. oz.	122,231	84,801	9,868	7,321
Medicinal oils .. cwt.	5,512	4,225	11,938	12,576
Proprietary medicines value	—	—	60,930	82,280
All other sorts .. ,,	—	—	53,542	37,717
Finished dye-stuffs obtained from coal tar cwt.	3,238	2,763	100,258	85,068
Extracts for dyeing ,,	3,981	3,770	9,366	7,162
Extracts for tanning (solid or liquid)—				
Chestnut .. cwt.	38,840	16,427	26,344	11,825
Quebracho .. ,,	32,080	12,680	29,390	11,718
All other sorts .. ,,	47,061	28,250	37,840	22,639
All other dyes and dye-stuffs .. .. cwt.	1,121	337	24,307	4,648
Painters' and printers' colours and materials—				
White lead (basic carbonate) .. cwt.	6,998	5,748	11,270	7,928
Lithopone .. ,,	29,742	25,385	18,965	15,914
Ochres and earth colours cwt.	68,389	68,200	21,523	20,388
Bronze powders and other metallic pigments .. cwt.	1,811	1,344	13,381	9,968
Carbon blacks .. ,,	46,416	44,639	67,064	56,160
Other pigments and extenders, dry .. cwt.	44,069	45,964	11,111	10,711
All other descriptions ,,	17,121	10,028	34,969	23,819
Total .. .. value	—	—	1,098,638	1,026,304

Exports

	Quantities. July 31.		Values. July 31.	
	1937.	1938.	1937.	1938.
			£	£
Acids—				
Citric .. .. cwt.	3,691	2,120	16,719	9,451
All other sorts .. value	—	—	25,519	21,388
Aluminium compounds tons	2,189	2,717	22,651	21,905
Ammonium compounds—				
Sulphate .. tons	29,425	21,722	181,287	140,252
All other sorts .. ,,	586	1,583	8,658	20,532
Bleaching materials—				
Bleaching powder (chloride of lime) .. cwt.	68,194	35,191	17,936	10,693
All other sorts .. ,,	6,605	3,332	15,245	7,454
Coal tar products—				
Cresylic acid .. galls.	220,677	81,893	38,639	12,697
Tar oil, creosote oil ..	3,546,515	2,198,864	93,106	55,500
All other sorts .. value	—	—	23,204	11,888
Copper, sulphate of tons	1,734	1,669	34,158	25,416
Disinfectants, insecticides, etc. .. .. cwt.	32,574	31,006	65,170	67,661
Fertilisers, manufactured tons	37,296	14,313	76,617	57,607
Glycerine .. .. cwt.	9,658	4,225	39,866	14,458
Lead compounds .. ,,	14,041	14,235	24,765	19,519
Magnesium compounds tons	383	338	9,613	9,187
Potassium compounds cwt.	4,580	5,580	10,166	9,577
Salt (sodium chloride) tons	28,474	27,659	81,469	72,231
Sodium compounds—				
Carbonate, including soda crystals, soda ash and bicarbonate cwt.	393,435	255,565	81,492	60,228
Caustic .. .. ,,	276,692	152,133	118,087	79,889
Nitrate .. .. ,,	322	1,162	256	506
Sulphate, including salt-cake .. .. cwt.	92,880	68,830	7,707	8,682
All other sorts .. ,,	77,140	63,712	99,629	90,809
Chemical manufactures and products .. value	—	—	23,725	20,760
Drugs, medicines and medicinal preparations cwt.	—	—	13,738	15,359
Zinc oxide .. tons	1,311	1,121	31,406	20,227
All other descriptions value	—	—	238,815	182,617
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts .. .. oz.	140,373	113,463	14,999	12,303
Proprietary medicines value	—	—	120,721	111,796
All other descriptions ,,	—	—	144,408	127,823
Dyes and dye-stuffs and extracts for dyeing and tanning—				
Finished dye-stuffs obtained from coal tar—				
Alizarine, alizarine red and indigo (synthetic) cwt.	3,572	166	20,345	1,862
Other sorts .. ,,	8,165	5,275	110,395	75,635
Extracts for tanning (solid or liquid) cwt.	24,696	11,991	21,567	10,884
All other descriptions ,,	3,440	1,454	13,671	8,194
Painters' and printers' colours and materials—				
Ochres and earth colours cwt.	14,860	9,624	14,543	9,264
Other descriptions ,,	16,506	19,102	32,652	36,832
White lead .. ,,	5,673	3,928	12,697	7,686
Ships' bottom compositions .. .. cwt.	3,504	2,562	11,798	8,443
Paints and painters' enamels .. .. cwt.	45,442	35,953	128,772	107,563
Varnish and lacquer (clear) .. galls.	76,525	65,238	30,882	27,514
Printers' ink .. cwt.	4,480	4,496	24,180	24,340
All other descriptions ,,	45,004	37,018	88,100	69,291
Total .. .. value	—	—	2,151,910	1,669,804

Re-Exports

	Quantities. July 31.		Values. July 31.	
	1937.	1938.	1937.	1938.
			£	£
Dyes and dye-stuffs and extracts for tanning cwt.	1,056	237	1,471	2,767
Painters' and printers' colours and materials cwt.	348	803	935	1,217
Total .. .. value	—	—	39,869	40,103

Personal Notes

The late MR. HENRY GLENDINNING, of St. Albans, late of Imperial Chemical Industries, left estate valued £146,074, with net personalty £139,215.

MR. M. R. F. ASHWORTH, B.Sc., of Oriel College, Oxford, has been awarded a one-year research scholarship in soil chemistry at the Macaulay Institute for Soil Research.

PROFESSOR H. J. CHANNON, professor of bio-chemistry at the University of Liverpool, is a member of the Commission appointed to visit Malay to survey existing arrangements for higher education, general and professional.

MR. ERNEST DOUGLAS HIGGINS, analytical chemist, of Flint, was fined £2, with £1 18s. 9d. costs, and ordered to have his licence endorsed, at Neston Police Court, for driving a motor-car without due care and attention.

MR. G. W. COOKE, B.Sc., of University College, Nottingham, has been awarded a three-year research scholarship in soil chemistry by the Agricultural Research Council, the first year to be spent at the Rothamsted Experimental Station.

MR. JOHN G. SEALY, who is retiring from the staff of Imperial Chemical Industries, Ltd., at Ardeer, belongs to a family which for over 150 years has been connected with the explosives industry. He was born at Kames, and before joining I.C.I. held appointments at Hounslow and Bedfont,

Mr. John G. Sealy.

Faversham, West Calder, and Roslin. When I.C.I. decided to concentrate the manufacture of black powder at Ardeer, Mr. Sealy was entrusted with the dismantling and demolition of other factories as they were closed. On the completion of this task he supervised the construction of the new plant at Ardeer. To mark his retirement Mr. Sealy has been presented with a grandfather clock by his colleagues and friends.

MR. B. C. KING, M.Sc., F.G.S., of Bury St. Edmund's, has taken up the Government appointment of chemist petrologist to the Department of Geological Survey in Uganda. Mr. King took his B.Sc. degree at Durham and later continued his research work at London University.

MR. JOHN B. THOMSON, of Girvan, Ayrshire, connected with the chemical and oil trade in Glasgow until he retired in 1922, and Mrs. Thomson, recently celebrated their golden wedding. Mr. Thomson for some time was analytical chemist to William Dickson, Ltd., Govan Iron Works, Glasgow.

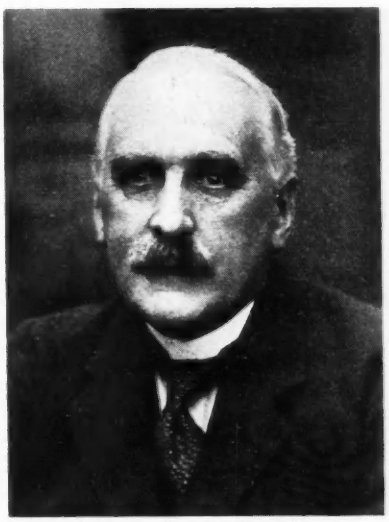
The late DR. WILLIAM STROUD, D.Sc., of Anniesland, Glasgow, and Bankell, Milngavie, chairman of Barr and Stroud, Ltd., makers of scientific instruments, of Glasgow, and formerly Cavendish professor of physics at Leeds University, and later Regius professor of engineering at Glasgow University, left personal estate in England valued at £152,290.

OBITUARY

MR EDGAR J. HESSLEIN, head of Neuss Hesslein Kempton, Ltd., of Manchester, the well-known firm of cotton spinners, bleachers, finishers and shippers, has died in New York, aged 73.

MR HENRY SAMUEL DENNY, a well-known engineer who was a great expert on mining and mineralogy, has been killed at Toronto in a motor-car accident, at the age of 66. He was responsible for the introduction of tube milling, filter pressing, and other improvements on the Rand. During the war he designed and organised for the Ministry of Munitions several factories for the production of high explosive.

MR. BENJAMIN DEAVILLE, chairman and managing director of Newball and Mason, Ltd., manufacturing chemists, Nottingham, has died after a long illness. Mr. Deaville was educated at Monmouth Grammar School and joined Mr. Thomas Mason, then trading as Newball and Mason, as an



Mr. Benjamin Deaville.

apprentice in 1880. He quickly gained a practical knowledge of the manufacture of extracts and essences, and the distillation of essential oils. He helped to develop the business through his inventive turn of mind, notably in the direction of still construction. On the death of Mr. Mason in 1911, he succeeded to the business, becoming sole proprietor. He occupied this position until 1925, when the business was converted into a private limited company with him as chairman and managing director.

Ten Years Back

From "The Chemical Age," August 18, 1928

The Society of Dyers and Colourists has instituted a research with the object of determining the effect of perspiration on dyed fabrics, under the direction of Professor McSwiney, of Leeds University Medical Department.

* * * *

Formerly practically a British monopoly, sulphate of ammonia is now mainly imported to Barcelona from Germany. During 1927, 4,543 tons were imported from Germany, 1,672 tons from the United Kingdom, and 976 tons from Italy.

* * * *

The Board of Trade Returns for July indicate that chemicals, drugs, dyes and colours were imported to the value of £1,125,205, an increase of £15,369 in the corresponding month of 1927, and a decrease of £163,655 on 1926; exports were valued at £2,074,375, an increase of £261,604 on 1927.

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Qualitative determination of finishes on artificial silk and wool. Ohl, *Kunstseide u. Zellwolle, 20*, 230-231.

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Minerals, Oils, Gas, Tar

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From Week to Week

THE LATVIAN CENTRAL FUEL CO. has signed a contract with the Soviet Union for the purchase of several shiploads of Soviet crude oil, petroleum and motor spirit. The first tanker will leave for Riga in September.

J. H. SANKEY & SON, LTD., in their new booklet on refractories, give full particulars of Pyruma, Siluma, Aluma and other Sankey fire cements; also the wide range of Sankey firebricks. The illustrations of the firebricks are particularly striking, as they reveal the natural colour and texture of each firebrick.

ACCORDING TO THE ANNUAL STATISTICS of the Society of Motor Manufacturers and Traders, the British motor car industry consumes per annum 2,610,000 gallons of paint, of which 1,510,000 gallons are for body finishes, 900,000 for parts and accessories and 200,000 for factory maintenance, 4,200 tons of plastics (represented by 1,500 tons of phenolic and filler, 200 tons urea, and 2,500 tons of muckites) and anti-freeze chemicals to a total of 60 tons.

STEEL OUTPUT in the United Kingdom showed a further fall in July, due to holiday stoppages. Total production was 683,200 tons, compared with 1,059,000 tons in July last year and 776,100 tons in June last. Holidays and the incidence of Whitsun render comparison difficult, but it will be recalled that the June figure was 30 per cent. below June, 1937—Whitsun fell in June, 1938, and May, 1937. The July figure is about 35 per cent. below that for July, 1937.

DOBBIE MCINNES, LTD., have issued a new catalogue describing "Dobbie-McInnes" 'Teledep' pneumatic tank indicators includes a guide to selection of types which should prove useful for deciding "at a glance" the most suitable instrument for any requirement. A new differential type, having exceptionally open scales and avoiding the use of unstable liquids, is described; this form is of special value for reading small increments of depth, etc., of tank contents.

RECENT RESEARCH DEVELOPMENTS in the chemistry of coal will be reported to the Division of Gas and Fuel Chemistry of the American Chemical Society at the 96th meeting of the Society, in Milwaukee, September 5 to 9. The themes will range from the cracking characteristics of coal to the oxidation of anthracite and its relationship to the decrease in heating value. One of the papers will deal with the behaviour of fusain, one of the banded constituents of coal, during liquefaction by hydrogenation.

COMPLAINTS OF THE PRESENCE OF LEAD in considerable quantities on foliage and grass have been made in a letter from Mr. A. E. Roberts, managing director of the Waterdale Dyeing and Finishing Co., Ltd., to the Prestwich District Council. It is stated the lead was found principally between the writer's works and the premises of the Chloride Electrical Storage Co. Mr. H. W. J. Hills, also wrote to the Council stating that he had been taking observations, and had noticed the presence of chlorine gas on 20 days out of 60. The Inspector of Alkali, etc., Works had been informed, and had requested the complainant to continue to keep records to ascertain whether there was any improvement during the present month.

THE SUPPLEMENT TO *Ciba Review*, No. 12, published by the Society of Chemical Industry in Basle, deals with Ciba and Cibanone colours for piece bleached coloured woven goods. All vat colours are not suitable for yarns for coloured woven piece bleached goods. Many Ciba and Cibanone colours, however, are suitable for this purpose, but the boiling and bleaching process varies considerably in different works and it is therefore advisable to give the dyestuff a prior test through the particular kier boiling and bleaching process in use. The presence of size in the warp is conducive to bleeding and marking off during kier boiling which makes it essential thoroughly to desize the material before kier boiling. An additional safeguard against the colours bleeding is provided by an addition of 2-4 lb., Albatex BD per 100 gallons liquor.

RECOMMENDATIONS FOR A CODE OF PRACTICE for the design and construction of reinforced-concrete structures for the storage of liquids have been made by the institution of civil engineers. The Department of Scientific and Industrial Research published in 1933 "Recommendations for a Code of Practice for the Use of Reinforced Concrete in Buildings," but the exclusion of structures for the storage of liquids from this code gave rise to a demand amongst engineers for a supplementary or additional code dealing with these structures. After referring to certain points in connection with imperviousness, cracking and corrosion in the introduction, the Code commences by stating that in structures for the storage of liquids, water has throughout been held in mind. The recommendations are, however, generally applicable to liquids and solutions which have no detrimental action on the concrete. No consideration has been given to the imperviousness of watertight concrete to liquids of low viscosity and high penetrating power (e.g., petrol). Copies of the code are available from William Clowes & Sons, Ltd., 94 Jermyn Street, London, S.W.1, price to members 1s. 6d. post free, non-members 2s. 6d. post free.

PREPARATIONS ARE BEING MADE by Scottish Oils, Ltd., to start boring for a new shale seam at West Calder.

THE URUGUAYAN GOVERNMENT has asked Parliament to vote a Bill imposing duties on imported refined fuels, in order to protect the refining of petrol by the national administration.

THE OUTPUT OF MARGARINE in the United Kingdom increased during July, and the average deliveries during the four weeks ended July 30 were 15 per cent. above the average for the same firms in the four weeks to July 31, 1937.

THE RECENT CHARTER CENTENARY CELEBRATIONS in Birmingham have been followed by the publication of a booklet dealing in more extended fashion with the industries which have contributed so much to the reputation which Birmingham enjoys.

OWING TO THE INCREASING DEMAND for practical co-operation on engineering problems, Head, Wrightson and Co., Ltd., of Thornaby-on-Tees, have opened a branch office at Birmingham, at Central House, 75 New Street. Telephone No.: Midland 5642. Mr. L. J. Mogridge has been appointed manager.

THE INSTITUTE OF COST AND WORKS ACCOUNTANTS will hold its 17th National Cost Conference at the Central Hotel, Glasgow, from September 8 to 10. The presidential address will be given on September 9, by Mr. G. Russell, and the annual banquet of the Institute will take place in the evening of that day.

NINE MORE OIL WELLS ARE TO BE SUNK by the Anglo-American Co., at Dalkeith, near Edinburgh, within a mile radius of the present operations. The initial tests at the Essex refinery of the 2,000 gallons recently despatched from Dalkeith have proved highly successful, and it is understood that the company has decided to develop as quickly as possible what is anticipated to be a big commercial proposition.

SOLEDON BRILLIANT ORANGE 6 RS PASTE, the latest addition to the I.C.I. range of Soledon dyestuffs is particularly suitable for the production of pale to medium strength shades on piece goods and for direct print styles on cotton and viscose rayon. I.C.I. have also recently issued leaflets giving the recipes recommended for the production on silk, cotton and wool of the British Colour Council shades for Spring and Summer, 1939.

POLAR VIOLET B CONC, a new product of the Geigy Colour Co., is the first violet of the Polar series and possesses the high general fastness properties characteristic of this group of colours. Like all Polar colours, it can be applied to wool in all stages of manufacture, to real silk, whether weighted or unweighted and to gloria (wool and silk). The new dyestuff also possesses good neutral dyeing properties and can, therefore, be used for covering animal fibres in union materials of all descriptions.

Commercial Intelligence

The following are taken from printed reports, but we cannot be **responsible for errors that may occur.**

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

Mortgages and Charges

AVIS FERTILISER CO., LTD., London, W. (M., 20/8/38.) August 3, £1,000 debentures, part of a series already registered. £1,500. December 31, 1936.

County Court Judgments

HORMONE LABORATORIES (firm), Manfield House, 378 Strand, W.C.2. (C.C., 20/8/38.) Manufacturing chemists. £41 5s. 9d. June 29.

BASEBE, DONALD, Reppip, 157 Ashburnham Road, Hastings. (C.C., 20/8/38.) Wholesale manufacturing chemists. £17 16s. 4d. July 12.

Receiverships

BRITON FERRY CHEMICAL AND MANURE COMPANY, LTD., 9 Queen Street Place, E.C.4. H. M. Barton, Alderman's House, Bishopsgate, E.C.2, has been appointed receiver, August 5, 1938, under powers contained in debenture dated May 25, 1927.

Partnership Dissolved

THE VASO CHEMICAL CO. (Thomas Maude Triffitt and Arnold Arthur Dudbridge), chemical manufacturers and merchants, Powell Road, Bolton Woods, Bradford. August 11, 1938.

Weekly Prices of British Chemical Products

STEADY conditions prevail in nearly all sections of the chemical market this week, and some improvement in the demand is in evidence both for the home market and for export. So far as existing commitments are concerned the movement is on a better scale than for some time past and buyers are again calling up fair quantities. Acetic acid and formaldehyde are in good demand and steady. Methylene chloride is reported weak. There are no important price changes to record for general chemicals, rubber chemicals and wood distillation products and on the whole values continue steady. A better volume of enquiry is reported for coal tar products, but transactions actually put through continue to be restricted to small quantities. Nominal prices are maintained in most sections of the market and it seems to be now generally accepted that values have touched bottom.

Price Changes

Rises: Sodium Phosphate, Tri-sodium;

Falls: Cadmium Sulphide; Carbolic Acid, crystals (Manchester); crude (Manchester); Cresylic Acid, pale, 99/100 per cent. (Manchester); Calcium Acetate, brown and grey; wood naptha, miscible; solvent.

MANCHESTER.—Business in chemical products on the Manchester market is still very much under the influence of the holiday season and so far as free bookings are concerned these during the past week have rarely been of great importance. There has been a sprinkling of new contracts extending over the next few months, but orders have been mainly confined to odd parcels for near delivery. Here and there contract deliveries have been somewhat freer than they have been during recent weeks, though there is still plenty of room for improvement in this respect, particularly to the textile branches. In the by-products market buying interest has been rather slow.

GLASGOW.—There has been a steady day to day demand for chemicals for home trade during the week, but export business still remains very quiet. Prices generally continue very firm at about previous figures with no important changes to report.

General Chemicals

ACETONE.—**£45 to £47 per ton.**

ACETIC ACID.—Tech, 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 2s. 6d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey, £18 10s. per ton, d/d U.K. Fine white, 98%, £17 per ton, d/d U.K.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8½d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £11 10s. per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. oags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 3½d. per lb. d/d station in 70-lb. cylinders (1-ton lots).

CHROMETAN.—Crystals, 2¼d. per lb.; liquor, £13 per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—10d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0¼d. per lb. MANCHESTER: 1s. 0¼d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in casks. MANCHESTER: £18 10s. per ton f.o.b. SCOTLAND: £18 15s. per ton, less 5%, Liverpool, in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £4 2s. 6d. to £5 2s. 6d. per cwt. according to quantity; in drums, £3 15s. 0d. to £4 7s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £30; brown, £1 per ton less. MANCHESTER: White, £30 10s.; brown, £30.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£30 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £30 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £30 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 10d. per lb.; powder B.P., 6s. 0d.; bichloride B.P. (corros. sub.) 5s. 1d.; powder B.P. 4s. 9d.; chloride B.P. (calomel), 5s. 10d.; red oxide cryst. (red precip.), 6s. 11d.; levig. 6s. 5d.; yellow oxide B.P. 6s. 3d.; persulphate white B.P.C., 6s. 0d.; sulphide black (hyd. sulph. cum sulph. 50%), 5s. 11d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3½d. per lb.

POTASH CAUSTIC.—Solid, £35 5s to £40 per ton according to quantity, ex store; broken, £42 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4½d. per lb. MANCHESTER: £37 per ton.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. SCOTLAND: 5¼d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 10¾d. to 11½d.

POTASSIUM PRUSSIATE.—6½d. per lb. SCOTLAND: 6¾d. net, in casks, ex store. MANCHESTER: Yellow, 6¼d. to 6½d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dog-tooth crystals, £36 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 11s. per ton.
SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags.
SODA, CAUSTIC.—Solid, 76/77° spot, 13s. 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.
SODIUM BICARBONATE.—Refined spot, £10 15s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 15s.
SODIUM BISULPHITE POWDER.—60/62%, £14 10s. per ton d/d in 2-ton lots for home trade.
SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.
SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.
SODIUM DICHROMATE.—Crystals cake and powder 4¼d. per lb. net d/d U.K. with rebates for contracts.
SODIUM CHROMATE.—4¼d. per lb. d/d U.K.
4d. per lb. GLASGOW: 4¼d. net, carriage paid.
SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.
SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.
SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s. 0d. per cwt. in 1-cwt. kegs, net, ex store.
SODIUM NITRITE.—£18 5s. per ton for ton lots.
SODIUM PERBORATE.—10%, 9½d. per lb. d/d in 1-cwt. drums.
SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.
SODIUM PRUSSIATE.—.d. per lb. for ton lots. GLASGOW: 5d. to 5¾d. ex store. MANCHESTER: 4¼d. to 5¼d.
SODIUM SILICATE.—£8 2s. 6d. per ton.
SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 12s. 6d.
SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.
SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.
TARTARIC ACID.—1s. 1¼d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1¼d. per lb. GLASGOW: 1s. 1d. per lb., 5%, ex store.
ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.
ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £6 10s. per ton, according to quality.
CADMIUM SULPHIDE.—3s. 9d. to 4s. per lb.
CARBON BLACK.—3¼d. to 3 15/16d. per lb., ex store.
CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.
CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 10¼d. to 11d. per lb.
DIPHENYLGUANIDINE.—2s. 2d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4¾d. to 5¾d. per lb.; dark 3¾d. to 4¾d. per lb.
LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.
SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.
VERMILION.—Pale, or deep, 4s. 9d. per lb., 1-cwt. lots.
ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938: November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.
CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1938: November, £7 10s.; December, £7 11s. 3d.; January, 1938, £7 12s. 6d.; February, £7 13s. 9d.; March, £7 15s.; April/June, £7 16s. 3d.
NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1938.
SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1938.
CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. MANCHESTER: Pure, 1s. 8d. per gal.; crude, 11½d. to 1s. per gal.
CARBOLIC ACID.—Crystals, 7½d. to 8½d. per lb., small quantities would be dearer; Crude, 60's, 1s. 10½d. to 2s. 1½d.; dehydrated, 3s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.
CREOSOTE.—Home trade, 4¾d. per gal., f.o.r. makers' works; exports 6¾d. to 6¾d. per gal., according to grade. MANCHESTER: 4½d. to 5¼d. GLASGOW: B.S.I. Specification, 6d. to 6¼d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils 5¾d. to 6¼d.
CRESYLIC ACID.—97/99%, 1s. 9d. to 2s.; 99/100%, 2s. 6d. to 3s. 6d. per gal., according to specification; Pale, 99/100%, 2s. 1d. to 2s. 3d.; Dark, 95%, 1s. 7d. to 1s. 8d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. MANCHESTER: Pale, 99/100%, 2s. 2d.
NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1d. to 1s. 3d. per gal., naked at works, according to quantity. GLASGOW: Crude, 6½d. to 7¼d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.
NAPHTHALENE.—Crude, whizzed or hot pressed, £5 to £6 per ton; purified crystals, £11 10s. per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £14 to £15, per ton f.o.b.
PITCH.—Medium, soft, 33s. per ton, f.o.b. MANCHESTER: 31s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.
PYRIDINE.—90/140%, 12s. to 14s. per gal.; 90/160%, 10s. to 11s. 3d. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 9s. to 10s. per gal.
TOLUOL.—90%, 1s. 10d. per gal.; pure, 2s. 2d. GLASGOW: 90%, 120, 1s. 10d. to 2s. 1d. per gal.
XYLOL.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 3d. to 2s. 3½d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £6 15s. to £9 5s. per ton; grey, £8 15s. to £9 5s. MANCHESTER: Brown, £8 10s.; grey, £10.
METHYL ACETONE.—40.50%, £36 to £38 per ton.
WOOD CREOSOTE.—Unrefined, 4d. to 6d. per gal., according to boiling range.
WOOD NAPHTHA, MISCIBLE.—2s. 8d. to 3s. per gal.; solvent, 3s. 3d. to 3s. 6d. per gal.
WOOD TAR.—£2 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.
BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11½d. per lb. d/d buyer's works.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-CRESOL, 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.
DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.
DINITROTOLUENE.—48/50° C., 9½d. per lb.; 66/68° C., 11d.
DIPHENYLAMINE.—Spot, 2s. 2d. per lb., d/d buyer's works.
GAMMA ACID, Spot, 4s. 4½d. per lb. 100% d/d buyer's works.
H ACID.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.
NAPHTHIONIC ACID.—1s. 10d. per lb.
β-NAPHTHOL —£97 per ton; flake, £94 8s. per ton.
α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.
β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.
NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.
o-NITRANILINE.—4s. 3½d. per lb.
m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 10d. to 2s. 3½d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 4¾d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
NITRONAPHTHALENE.—10½d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.
SULPHANILIC ACID.—Spot, 8¾d. per lb. 100%, d/d buyer's works.
o-TOLUIDINE.—11d. per lb., in 8/10 cwt. drums, drums extra.
p-TOLUIDINE.—1s. 11d. per lb., in casks.
m-XYLIDINE ACETATE.—4s. 8d. per lb., 100%.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Application for Patents

MANUFACTURE OF SALTS of the ω-alkyl-sulphonic acids of pyrazolonamines.—W. W. Groves (I. G. Farbenindustrie.) 22183.

MANUFACTURE OF PANCREAS HORMONE PREPARATIONS.—W. W. Groves (I. G. Farbenindustrie.) 22341.

MANUFACTURE OF ACYLATED HALOGEN-ALKYLAMINES.—W. W. Groves (I. G. Farbenindustrie.) 22342.

MANUFACTURE OF SECONDARY, ETC., AMINES of the pyrazolone series.—W. W. Groves (I. G. Farbenindustrie.) 22344.

METHOD FOR STABILISING SILVER SALT LAYERS.—J. Hallo. 22066.

MANUFACTURE OF POLYAZO-DYESTUFFS.—I. G. Farbenindustrie. (Germany, July 24, '37.) 21915.

PRODUCTION OF WATER-REPELLENT FIBROUS MATERIALS.—I. G. Farbenindustrie.) (Germany, July 26, '37.) 21936.

MANUFACTURE OF DYESTUFF INTERMEDIATE PRODUCTS.—I. G. Farbenindustrie. (Germany, July 16.) 22025, 22026.

MANUFACTURE OF WOOL DYESTUFFS of the anthraquinone series. I. G. Farbenindustrie. (Germany, July 26, '37.) 22233; (Germany, May 6.) 22234.

MANUFACTURE OF HYDROXYLAMINE HYDROCHLORIDE.—I. G. Farbenindustrie. (Germany, Aug. 17, '37.) 22350.

MANUFACTURE OF CONDENSATION PRODUCTS of the diphenylamine series.—I. G. Farbenindustrie. (Germany, July 27, '37.) 22386.

MANUFACTURE OF SYNTHETIC RUBBER.—Istituto per lo Studio Della Gomma Sintetica. (Italy, July 21, '37.) 21675.

CATALYTIC CRACKING OF HYDROCARBONS.—G. W. Johnson (I. G. Farbenindustrie.) 21679.

PREPARATION OF METHYLOL COMPOUNDS which are stable in storage.—G. W. Johnson (I. G. Farbenindustrie.) 21680.

MANUFACTURE, ETC., OF INTERPOLYMERISATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) 21681.

MANUFACTURE, ETC., OF VAT DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 21683.

MANUFACTURE, ETC., OF DEHYDROGENATION PRODUCTS of hydroxy compounds.—G. W. Johnson (I. G. Farbenindustrie.) 21684.

MANUFACTURE OF BUTADIENE.—G. W. Johnson (I. G. Farbenindustrie.) 21813.

SOLVENTS, ETC., FOR FILM-FORMING PLASTIC MASSES.—G. W. Johnson (I. G. Farbenindustrie.) 21814.

MANUFACTURE, ETC., OF CELLULOSE FROM WOOD.—G. W. Johnson (I. G. Farbenindustrie.) 21815.

MANUFACTURE, ETC., OF HYDROCARBONS from carbon monoxide and hydrogen.—G. W. Johnson (I. G. Farbenindustrie.) 21885.

MANUFACTURE, ETC., SUBSTITUTED PYRROLIDONES.—G. W. Johnson (I. G. Farbenindustrie.) 21887.

PRODUCTION OF AMMONIUM NITRATE and hydrogen sulphide from gases containing ammonia and hydrogen sulphide and nitric acid.—G. W. Johnson (I. G. Farbenindustrie.) 22040.

MANUFACTURE, ETC., OF AZO DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 22041.

POLMERISATION PROCESSES.—G. W. Johnson (I. G. Farbenindustrie.) 22359, 22360.

RECOVERY OF PHENOL FROM OILS, ETC.—G. W. Johnson (I. G. Farbenindustrie.) 22361.

ALLOYS FOR USE AS BEARING METALS.—P. Kemp. (Austria, July 21, '37.) 21699.

MONOAZO DYESTUFFS.—A. H. Knight, and Imperial Chemical Industries, Ltd. 22268.

METHOD OF INCREASING RESISTANCE OF STEELS to hydrogen under pressure.—Kohle-und Eisenforschung Ges. (Germany, Oct. 20, '37.) 22181.

TREATMENT OF NICKELIFEROUS SULPHIDE ORES.—Lindley Duffield and Co. (Metallurgical and Finance), Ltd., and L. F. W. Leese. 21621.

MANUFACTURE OF SYNTHETIC POWDERED JAPANESE SOY.—S. Machida. 22226.

PRODUCTION OF BENZINE-SOLUBLE OIL-RESIN SIZE.—C. Mascke. (Germany, July 27, '37.) 22259.

PRODUCTION OF SYNTHESIS GAS by gasefication of fuels under elevated pressure.—Metallges, A.-G. (Germany, Sept. 27, '37.) 22260.

PROCESS FOR RECOVERY OF ORGANIC OXY-COMPOUNDS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (United States, Aug. 10, '37.) 22079.

PRODUCTION OF CYCLO-PENTANO-POLYHYDRO-PHENTHRENE KETONES. Naamlooze Vennootschap Organon. (Switzerland, July 25, '37.) 22065.

PREVENTION OF ATTACKS OF METALS BY ACIDS.—Naamlooze Vennootschap Stikstofbindingsindustrie Nederland, and P. F. Felkers. 21848.

STEROLE COMPOUNDS, ETC.—Parke, Davis and Co. (United States, Aug. 6, '37.) 22223; (United States, Aug. 7, '37.) 22224.

KETONE COMPOUNDS, ETC.—Parke, Davis, and Co. (United States, Aug. 10, '37.) 22225.

PROCESS FOR OBTAINING HYDROCARBON OILS FROM SOLID COALS.—A. Pott, and H. Broche. (Germany, Aug. 4, '37.) 22000.

PREHEATING OF THE INITIAL MATERIALS in the destructive hydrogenation of bituminous coal.—H. E. Potts (Naamlooze Vennootschap Internationale Hydrogeneeringsoctrooien Maatschappij). 21964.

PRODUCTION OF ANTI-CORROSIVE COATINGS.—K. E. H. Rodwell. 21938.

PREPARATION OF TECHNICALLY VALUABLE CHLORINATED HYDROCARBONS.—Röhm and Haas, A.-G. (Germany, July 22, '37.) 21822.

SEPARATION OF COMPONENTS OF A MIXTURE OF HYDROCARBONS.—R. F. Ruthruff (Kellog Co.). 22375.

PRODUCTION OF MATURED ALKALI CELLULOSE from an alkaline digested cellulose pulp.—Schlesische Zellwolle, A.-G. (Germany, July 24, '37.) 21690.

COMBUSTION OF OIL.—C. Scott-Snell. 21958.

MANUFACTURE OF DERIVATIVES OF DIHYDROOESTRINE SERIES.—Soc. of Chemical Industry in Basle. (Switzerland, Sept. 27, '37.) 21916.

MANUFACTURE OF ALDEHYDES of the cyclo-pentano-polyhydrophenanthrene series.—Soc. of Chemical Industry in Basle. (Switzerland, July 25, '37.) 22027; (Switzerland, July 13.) 22028.

MANUFACTURE OF SATURATED, ETC., DERIVATIVES of the 3-keto-cyclopentanopolyhydrophenanthrene series.—Soc. of Chemical Industry in Basle. (Switzerland, July 26, '37.) 22184; (Switzerland, July 2.) 22185.

MANUFACTURE OF NITROGENOUS ANTHRAQUINONE DERIVATIVES.—Soc. of Chemical Industry in Basle. (Switzerland, July 29, '37.) 22346; (Switzerland, June 15.) 22347.

PROCESS FOR THE SEPARATION, ETC., OF CARBONYL COMPOUNDS obtainable by side chain degradation of steroids.—Soc. of Chemical Industry in Basle. (Switzerland, Aug. 4, '37.) 22348; (Switzerland, June 24.) 22349.

PRODUCTION OF POLYSACCHARIDE MATERIALS.—G. L. Stahly, and W. W. Carlson. (United States, July 29, '37.) 22235, 22236.

PRODUCTION OF PARAFFIN.—Studien-und Verwertungsges. (Germany, July 30, '37.) 22394.

PRODUCTION OF PIG-IRON.—A. Thyssen-Hütte, A.-G. (Germany, Oct. 2, '37.) 21859.

PRODUCTION OF HYDROCARBONS.—A. J. V. Underwood. 21664.

COLOURING-MATTERS OF THE PORPHINS SERIES.—M. Wyler, and Imperial Chemical Industries, Ltd. 22093.

LAMINATED SYNTHETIC RESIN SHEETS, ETC.—R. Young, and S. Rosenfeld. 22100.

STABILISATION OF CELLULOSE ESTERS.—Afag Finanzierungs, A.-G. (France, July 31, '37.) 22861.

ALLOYS.—Baker and Co., Inc. (United States, Jan. 29.) 22749.

ORGANIC NITROGEN COMPOUNDS.—A. W. Baldwin, M. A. T. Rogers, and Imperial Chemical Industries, Ltd. 22852.

PRODUCTION OF PIGMENTED BASES FOR LACQUERS, ETC.—Binney and Smith Co. (United States, Aug. 2, '37.) 22889; (United States, Aug. 4, '37.) 22890.

PROCESS FOR MANUFACTURE OF IRON, ETC.—W. J. Campbell. 22780.

ALUMINIUM ALLOYS.—H. W. Clarke, and L. Aitchinson. 22561.

CONVERSION OF ALKALINE EARTH METAL OXALATES, ETC.—I. L. Clifford, and Imperial Chemical Industries, Ltd. 22531.

MANUFACTURE OF COMPOUNDS.—J. S. H. Davies, and Imperial Chemical Industries, Ltd. 22688, 22849.

PREPARATION OF HOMOGENEOUS MIXED PRODUCTS.—Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler. (Germany, April 26.) 22661.

POLYMERISATION OF ORGANIC COMPOUNDS.—Distillers Co., Ltd., H. M. Stanley, and E. H. Brittain. 22643.

MANUFACTURE OF FORMALDEHYDE.—Distillers Co., Ltd., and J. Francon. 22979.

MANUFACTURE OF CATALYSTS.—Distillers Co., Ltd., and J. Francon. 22980.

MANUFACTURE OF AZO PIGMENTS.—E. I. du Pont de Nemours and Co. (United States, July 28, '37.) 22532

MANUFACTURE OF SULPHURISED DIHYDROPOLYCYCLIC AROMATIC HYDROCARBONS, ETC.—E. I. du Pont de Nemours and Co. (United States, July 29, '37.) 22690.

MANUFACTURE OF THERAPEUTICALLY ACTIVE COMPOUNDS.—G. M. Dyson. 22992.

PROCESS FOR REDUCTION OF CUPRIFEROUS MATERIAL.—F. Eulenstein, A. Krus, and Sachtleben, A.-G., für Bergbau und Chemische Industrie. 22885.

ANNEALING BOX ALLOYS.—Ferror Steel Corporation. (Austria, Sept. 20, '37.) 22512.

PROCESS, ETC., FOR THE HYDROLYSIS of cellulose material, etc. H. M. L. R. Fouque. 22525.

MANUFACTURE OF AMINOARYL SULPHONES.—J. R. Geigy, A.-G. (Switzerland, July 31, '37.) 22646.

PRODUCTION OF ARTIFICIAL RESINS.—F. Glass. 22918.
MEANS FOR WELDING ALUMINIUM ALLOYS.—B. Green. 22416.
PRODUCTION OF FAST DYEINGS on vulcanised fibre.—W. W. Groves (I. G. Farbenindustrie.) 22602.
MANUFACTURE OF THREADS from polyvinyl resins.—W. W. Groves (I. G. Farbenindustrie.) 22958.
PRODUCTION OF SOLUTIONS of highly chlorinated polyvinyl chloride.—W. W. Groves (I. G. Farbenindustrie.) 22959.
METHOD OF CARRYING OUT METALLURGICAL REACTIONS.—Hanne-mann-Lohse Hütten-Ges. (Germany, July 30, '37.) 22668.
MANUFACTURE OF BLEACHING, ETC., AGENTS.—Henkel and Cie., Ges. (Germany, Sept. 7, '37.) 22524.
MANUFACTURE, ETC., OF SYNTHETIC RESINS.—I. G. Farbenindustrie. (Germany, July 30, '37.) 22863; (Germany, Aug. 3, '37.) 22864.
PROCESS FOR RENDERING FIBROUS MATERIAL WATERPROOF, ETC.—I. G. Farbenindustrie. (Germany, Aug. 2, '37.) 22882.
PRODUCTION OF DYESTUFF PREPARATIONS.—I. G. Farbenindustrie. (Germany, Aug. 3, '37.) 22940; (Germany, March 10.) 22941.
MANUFACTURE OF ACID-PROOF MORTARS.—I. G. Farbenindustrie. (Germany, Aug. 20, '37.) 22942.
MANUFACTURE OF 1-AMINO-2-CHLORO (or bromo)-4 (or 6)-nitrobenzene-6 (or 4)-sulphonic acid.—I. G. Farbenindustrie. (Germany, Sept. 17, '37.) 22943.
MANUFACTURE OF 2-CHLORO (or bromo)-4 (or 6)-nitro-1-aminobenzene-6 (or 4)-sulphonic acid.—I. G. Farbenindustrie. (Germany, Nov. 20, '37.) 22944.
MANUFACTURE OF CONDENSATION PRODUCTS.—I. G. Farbenindustrie. (Germany, Aug. 3, '37.) 23001.
MANUFACTURE OF α-HALOGEN-VINYL METHYL KETONES.—I. G. Farbenindustrie. (Germany, Aug. 3, '37.) 23002.
MANUFACTURE OF BASIC COPPER SALTS.—I. G. Farbenindustrie, and Duisburger Kufper-hütte. (Germany, July 29, '37.) 22518.
REGENERATING COPPER contained in waste liquors of cuprammonium artificial silk production.—I. G. Farbenindustrie and Duisburger Kufperhütte. (Germany, July 30, '37.) 22519.
MANUFACTURE, ETC., OF PHENYL-ACETYLENE.—G. W. Johnson (I. G. Farbenindustrie.) 22499.
MANUFACTURE, ETC., OF STABLE LEUCO COMPOUNDS OF ANTHRAQUINONE VAT DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 22500.
MANUFACTURE, ETC., OF ORGANIC HALOGEN-SULPHONIC ACID HALIDES.—G. W. Johnson (I. G. Farbenindustrie.) 22501.
MANUFACTURE, ETC., OF TRISAZO DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 22589.
MANUFACTURE, ETC., OF HIGH MOLECULAR WEIGHT COMPOUNDS containing oxygen.—G. W. Johnson (I. G. Farbenindustrie.) 22588.
MANUFACTURE, ETC., OF SUBSTANTIVE DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 22590.
MANUFACTURE, ETC., OF HYDROCARBONS from carbon monoxide and hydrogen.—G. W. Johnson (I. G. Farbenindustrie.) 22865.
MANUFACTURE, ETC., OF BUTENE-DIOLS.—G. W. Johnson (I. G. Farbenindustrie.) 22866.
MANUFACTURE, ETC., OF ALIPHATIC SULPHONIC ACID HALIDES.—G. W. Johnson (I. G. Farbenindustrie.) 22977.
HALOGENATION OF HYDROCARBONS.—G. W. Johnson (I. G. Farbenindustrie.) 22978.
MANUFACTURE OF SOLUBLE NITRO DYESTUFFS.—A. H. Knight, F. H. Pearman, and Imperial Chemical Industries, Ltd. 22848.
PREPARATION OF EMULSIONS for the bleach-out process.—Kodak, Ltd. (United States, July 31, '37.) 22845.
PREPARATION OF COLOURING-MATTERS.—J. L. Moilliet, and Imperial Chemical Industries, Ltd. 22540.

Complete Specifications Open to Public Inspection

REFINING LEAD which contains bismuth.—Soc. Miniere and Metallurgique de Penarroya. Jan. 11, 1937. 30415/37.
METHOD OF PRODUCING OIL from fat-containing protein material.—L. T. Hopkinson. Feb. 2, 1937. 2199/38.
MANUFACTURE OF ION EXCHANGE BODIES.—I. G. Farbenindustrie. Feb. 6, 1937. 2776/38.
TREATMENT OF FLUIDS.—British Celanese, Ltd. Feb. 5, 1937. 2796/38.
MANUFACTURE OF AMINO FATTY ACID DERIVATIVES.—J. R. Geigy, A.-G. Feb. 5, 1937. 3126/38.
PRODUCTION OF CHROMIUM COMPOUNDS of mordant dyestuffs soluble in organic solvents containing hydroxyl groups.—J. R. Geigy, A.-G. Feb. 6, 1937. 3248/38.
MANUFACTURE OF DYESTUFFS and intermediate products.—Soc. of Chemical Industry in Basle. Feb. 3, 1937. 3254/38.
ETHERIFICATION PRODUCTS of oxyalkylamines.—E. M. Schwarz, F. O. Zschimmer, G. E. Zschimmer, G. M. W. Schwarz, and F. R. Schwarz (trading as Zschimmer and Schwarz.) Feb. 3, 1937. 3459/38.
MANUFACTURE AND PRODUCTION OF HIGH MOLECULAR WEIGHT ALDEHYDES, ketones, and alcohols.—I. G. Farbenindustrie. Feb. 6, 1937. 3275/38.
PREPARING NITROCELLULOSE.—Kodak, Ltd. Feb. 4, 1937. 3480/38.
RECOVERY OF CELLULOSE ETHERS.—Dow Chemical Co. Feb. 5, 1937. 3606/38.
MANUFACTURE OF AQUEOUS SOLUTIONS.—Deutsche Hydrierwerke, A.-G. Feb. 4, 1937. 3638/38.
MIXING OF SOLID CARBONACEOUS SUBSTANCES and liquid substances.—I. G. Farbenindustrie. Feb. 6, 1937. 3801/38.
VAPORISATION OF ALLOYS in a high vacuum.—Siemens and Halske, A.-G. Feb. 6, 1937. 3804/38.

Specifications Accepted with Dates of Application

PIGMENTING OR DYEING FIBROUS OR FILM-LIKE MATERIALS produced from highly polymeric organic bodies.—W. W. Groves (Aceta Ges.). Oct. 24, 1936. 489,645.
PROCESS FOR THE MANUFACTURE OF Δ 1:2 UNSATURATED KETONES of the cyclo-pentano-polyhydro-phenanthrene series.—Schering-Kahlbaum, A.-G. Nov. 5, 1935. (Samples furnished.) 489,692.
DYEING CELLULOSE ETHERS and esters.—G. W. Johnson (I. G. Farbenindustrie.) Dec. 30, 1936. 489,698.
MELTING AND REFINING OF MAGNESIUM and its alloys.—Soc. de Produits Chimiques des Terres Rares. Jan. 6, 1936. 489,700.
METHOD OF PRODUCING AN ACID-PROOF COLOURED LAYER on the surface of aluminium or its alloys.—K. Nagata. Oct. 31, 1936. 489,926.
MANUFACTURE OF IMPROVED ELECTRICAL INSULATING MATERIAL from cellulose.—L. S. E. Ellis (Chemical Works, formerly Sandoz). Nov. 5, 1936. 489,928.
MANUFACTURE AND PRODUCTION OF COMPOUNDS of the anthraquinone series.—G. W. Johnson (I. G. Farbenindustrie.) Dec. 30, 1936. 489,697.
MANUFACTURE AND PRODUCTION OF AZO DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) Jan. 4, 1937. (Samples furnished.) 489,934.
VITAMIN PRODUCT.—Atlantic Coast Fisheries Co. Oct. 10, 1936. 489,970.
VITAMIN PRODUCT.—Atlantic Coast Fisheries Co. Dec. 3, 1936. 490,001.
MANUFACTURE OF CAST-IRON ALLOYS.—British Cast Iron Research Association, British and Dominions Feralloy, Ltd., and J. W. Pampfylde. Jan. 30, 1937. 489,936.
GLUEING SYNTHETIC RUBBER.—H. Heine (trading as Heine Mobelfabrik, Propellerwerk, H.). Dec. 22, 1936. 489,764.
PRODUCTION OF CRYSTALLINE DEXTROSE.—International Patents Development Co. Dec. 14, 1936. 489,937.
TREATMENT OF CARBONACEOUS MATERIALS.—F. Uhde. Feb. 1, 1936. (Addition to 468,680.) 489,664.
AMINO-DERIVATIVES OF CELLULOSE.—E. I. du Pont de Nemours and Co. Jan. 31, 1936. 489,668.
MANUFACTURE OF CELLULOSE ESTERS.—J. E. Jones, and A. C. Cox. Feb. 2, 1937. 489,720.
APPARATUS FOR UNINTERRUPTED DISSOLUTION OF CELLULOSE XANTHATE.—W. W. Groves (I. G. Farbenindustrie.) Feb. 3, 1937. 489,768.
COLOURING OF ARTICLES comprising vinyl polymerides containing halogen.—W. W. Groves (Deutschen Celluloid-Fabrik.) Feb. 3, 1937. 489,725.
MANUFACTURE AND PRODUCTION OF WATER-SOLUBLE BASIC ALUMINIUM COMPOUNDS.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 3, 1937. 489,769.
PROPYL METHACRYLATE, its manufacture and applications.—R. Hill, and Imperial Chemical Industries, Ltd. Feb. 3, 1937. 490,007.
MANUFACTURE OF COLOURED ARTIFICIAL MATERIALS having a basis of regenerated cellulose.—P. F. C. Sowter, and R. Betteridge. Feb. 4, 1937. 489,858.
MANUFACTURE OF MIXTURES OF HIGHER FATTY ALCOHOLS and of their sulphonated derivatives.—W. J. Tennant (Henkel and Cie. Ges.). Feb. 4, 1937. (Convention date not granted.) 489,863.
MANUFACTURE OF TERTIARY ALIPHATIC AMINES.—I. G. Farbenindustrie. Feb. 5, 1937. 489,731.
MANUFACTURE AND PRODUCTION OF DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 5, 1937. 490,017.
MANUFACTURE AND PRODUCTION OF CONVERSION COMPOUNDS OF PYRENE.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 5, 1937. 490,018.
PREPARATION OF DISUBSTITUTED AMIDES of coumarin-3-carboxylic acid.—K. Merck, L. Merck, W. Merck and F. Merck (trading as E. Merck (firm of)). March 13, 1936. 489,952.
MANUFACTURE OF RUBBER CHLORIDE and like compositions.—Raolin Corporation. Feb. 5, 1936. 489,954.
MANUFACTURE OF TANNING AGENTS.—I. G. Farbenindustrie. Feb. 8, 1936. 489,967.
PROCESS FOR THE MANUFACTURE OF AZO DYESTUFFS on the fibre.—I. G. Farbenindustrie. Feb. 8, 1936. 489,972.
PROCESS FOR THE MANUFACTURE OF POLYMERIC PRODUCTS derived from aromatic vinyl hydrocarbons.—A. Carpmael (I. G. Farbenindustrie.) Feb. 8, 1937. (Addition to 456,359.) 489,973.
PROCESS FOR THE MANUFACTURE OF ADDITION PRODUCTS of 3,4-dehydrocyclotetramethylene sulphone.—A. Carpmael (I. G. Farbenindustrie.) Feb. 8, 1937. 489,974.
TREATMENT OF SUBSTANCES containing tantalum and/or niobium.—W. W. Triggs (Soc. Generale Metallurgique de Hoboken). March 22, 1937. 489,742.
PROCESS FOR THE MANUFACTURE OF RUBBER CHLORIDE VARNISHES.—Raolin Corporation. Feb. 5, 1936. (Divided out of 489,954.) 489,977.

DYEING AND PRINTING OF CELLULOSE ESTER FIBRES.—Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimique du Nord Reunies Etablissements Kuhlmann. March 27, 1936. 489,738.

ABSORPTION AND SUBSEQUENT RECOVERY OF SULPHUR DIOXIDE from gases containing the same.—V. F. Feeny (Consolidated Mining and Smelting Co. of Canada, Ltd.). May 20, 1937. 489,745

PRODUCTION OF HYDROGEN PEROXIDE.—Mathieson Alkali Works. June 25, 1936. 489,978.

PRODUCTION OF ALKALI METAL and hydrogen peroxides.—Mathieson Alkali Works. June 25, 1936. 489,979.

RESINOUS COMPOSITIONS.—British Thomson-Houston Co., Ltd. July 1, 1936. 489,747.

REFINING HYDROCARBON OILS.—Edeleanu Ges. July 16, 1936. 489,808.

RECOVERY OF THE SULPHUROUS ACID produced in the sulphite cellulose cooking process.—Zellstoff-fabrik Waldhof. March 9, 1937. 489,753

Company News

Calico Printers' Association, Ltd., announces a loss of £93,542 in its preliminary statement for the year, to June 30 last. In the previous year a profit of £116,174 was earned compared with a loss of £47,247 in 1935-36. The past year's loss is struck after providing £367,228, against £372,428, for maintenance, depreciation, repairs, renewals and upkeep, and £128,000 for debenture interest. A transfer of £50,000 is made from the general reserve, which enables the company to carry forward a credit balance of £39,809 compared with £83,351 brought in. No dividends are to be paid on the preference and ordinary stocks. Last year the dividend on the 5 per cent. preference stock for the half-year ended December 31, 1935, was paid. The last distribution on the ordinary stock was 5 per cent. for 1928-29.

E. I. du Pont de Nemours, has declared a third interim dividend of 75c. per common share, payable on September 14, to holders on record on August 22. The two previous interims were of 50c. each. This time last year a dividend of $1.50 per share was declared. For the whole of 1937 $6.25 was paid on the common shares, out of earnings of $7.29 per share. For the quarter to June 30 last net earnings available for common dividends, after preferred dividends, amounted to $7,675,106, equal to 69c. per share, against $22,183,491, or $2.01 per share for the June quarter of 1937. Earnings for the first quarter of 1938 amounted to $6,858,706, or 65c. per share. Company reports that business is running 15 per cent. above the level of early June, and that a further gradual improvement is expected.

New Companies Registered

Mikrokemia Chemical Manufacturers, Ltd. 343,205.—Private company. Capital £500 in 500 shares of £1 each. To carry on the business of manufacturers and importers of, agents for and dealers in office furniture, manufacturers of chemicals, drugs, medicines, and all pharmaceutical requirements, etc. Directors: Walter Barkany, Budapest V Pozsonyi Ut. 48; Jack O. Gore, 29 Chinbrook Road, Grove Park, S.E.2., Robert S. Hughes, 276 Reede Road, Dagenham, Essex. Registered office: 15 New Bridge Street, E.C.4.

Olympic Varnish Co., Ltd. 343,387.—Private company. Capital £1,000 on 1,000 shares of £1 each. To carry on business as manufacturers of and dealers in varnish, enamel, polish, etc. Directors: Fred Oberlander, 107 (A), Old Brompton Road, S.W.7; Caroline Oberlander. Registered office: 68 Finsbury Pavement, E.C.2.

Medical Gases, Ltd. 9671.—Private company. Capital £5,000 in 5,000 shares of £1 each. To carry on the business of dealers in, distributors of and manufacturers of oxygen, nitrogen, carbonic acid, anaesthetics or any other kindred substances, etc. Directors: Samuel Warnock Aitken, 197, Mount Prospect Avenue, Dollymount, Dublin; Thomas Alfred Fannin; William Jones.

Books Received

Elementary Thermodynamics. By Virgil Moring Faires. New York and London: Pp. 225. 12s.

Manual du Savonnier. By A. Matagrin. Paris: Gauthier-Villars. Pp. 268. 30 Fr.

Applied Thermodynamics. By Virgil Moring Faires, New York and London: Macmillan. Pp. 374. 17s.

Introductory General Chemistry. Revised Edition. By Stuart R. Brinkley. New York and London: Macmillan. Pp. 731. 10s. 6d.

A Course in General Chemistry. Revised Edition. By William C. Bray and Wendell M. Latimer. New York and London: Macmillan. Pp. 159. 7s. 6d.

Organic Syntheses. Vol. XVIII. Reynold C. Fuson, Editor-in-Chief. New York: John Wiley and Sons, Inc. London: Chapman and Hall, Ltd. 8s. 6d.

Chemical and Allied Stocks and Shares

SENTIMENT on the Stock Exchange has been dominated by a tendency to await the outcome of recent developments in European politics, and in the circumstances it is hardly surprising that the volume of business in industrial and kindred securities has remained at a low ebb. Although the undertone of markets was described as reasonably steady, the tendency was for only a small amount of selling of individual shares to affect prices rather sharply. Numerous shares of companies associated with the chemical and allied trades which have a large following tend to move closely with the general trend of markets, and in many cases prices are below those ruling a week ago.

Distillers have gone back from 98s. 3d. to 96s. 6d. at the time of writing, and Turner and Newall from 79s. 6d. to 77s. 9d., while British Oxygen are 69s. 4½d., and Murex at 77s. 6d. show a loss of 2s. 6d., although the market remains hopeful that the results of the latter company may show a rather higher dividend. Imperial Chemical at 31s. 4½d. are within 4½d. of the price ruling a week ago, more hopeful views as to the interim dividend having continued to assist sentiment to some extent. Triplex Glass at 33s. 6d. are within 6d. of the price current last week, the 25 per cent. dividend, which compares with 35 per cent. paid for the previous year, having been in accordance with general market expectations. The full results and meeting are being awaited with considerable interest because of the conflicting views current in regard to the outlook for the safety glass trade now that the output of motor cars is showing a decline. Lancegaye Glass were little changed at 3s. 6d., and British Indestructo Glass shares have improved 6d. to 3s. 4½d. at the time of writing. United Glass Bottle have been less active this week, but at 50s. 6d. have held their recent improvement, awaiting the interim dividend announcement, which will probably be made early next month.

Associated Portland Cement were reported to be a firmer market and the price is 80s. at the time of writing, which compares with 79s. 4½d. a week ago. The interim dividend of this company is due shortly and is being awaited with a good deal of interest in the market because of the less active conditions ruling in the building trades. Last year the interim was 7½ per cent., followed by a final of 15 per cent., making a total distribution of 22½ per cent. British Plaster Board shares were little changed at 27s. On the other hand, Pinchin Johnson 10s. ordinary have reacted sharply from 32s. to 29s. 6d. owing to uncertainty whether the interim dividend will be kept at 7½ per cent. because the company has considerable interests abroad and has to meet the difficulties connected with overseas trade. International Paint at 69s. 4½d. are within 1s. 1½d. of the price current a week ago, and Indestructible Paint at 81s., are well maintained. The interim dividends of these companies are also due shortly. Fison Packard and Prentice were rather more active and transferred over 35s. Imperial Smelting were lowered to 10s., but British Aluminium were relatively steady around 48s. 9d., which is within 3d. of the figure current a week ago.

Courtaulds have declined slightly to 30s. 7½d., but there was a good deal of profit-taking in British Celanese ordinary and preference shares following their improvement of last week. Textile shares generally, which were recently tending to become a firmer market on the view that the outlook for the export side of the industry is rather more hopeful, have made rather lower prices, including Calico Printers at 5s. 3d., and Bradford Dyers at 4s. 3d.

Boots Pure Drug have moved down 6d. to 41s. 3d., but Sangers remained around 23s. 4½d., and Timothy Whites and Taylors are little changed at 25s., compared with 25s. 3d. British Drug Houses transferred at 21s. 9d. B. Laporte at 87s. 6d., and Greeff-Chemicals Holdings 5s. units at 6s. 3d., were unchanged. Beechams Pills deferred shares were higher at 56s. 10½d. on the directors' proposals. Monsanto Chemicals preference at 22s. 6d. were well maintained. Swedish Match were lowered to 25s. 3d., and International Nickel have gone back to $49¼ under the influence of the figures for the June quarter which show that earnings on the common shares were only 42 cents per share, or less than the quarterly dividend of 50 cents per share declared recently. Other shares with an international market, including those of the leading oil companies, were also reactionary.